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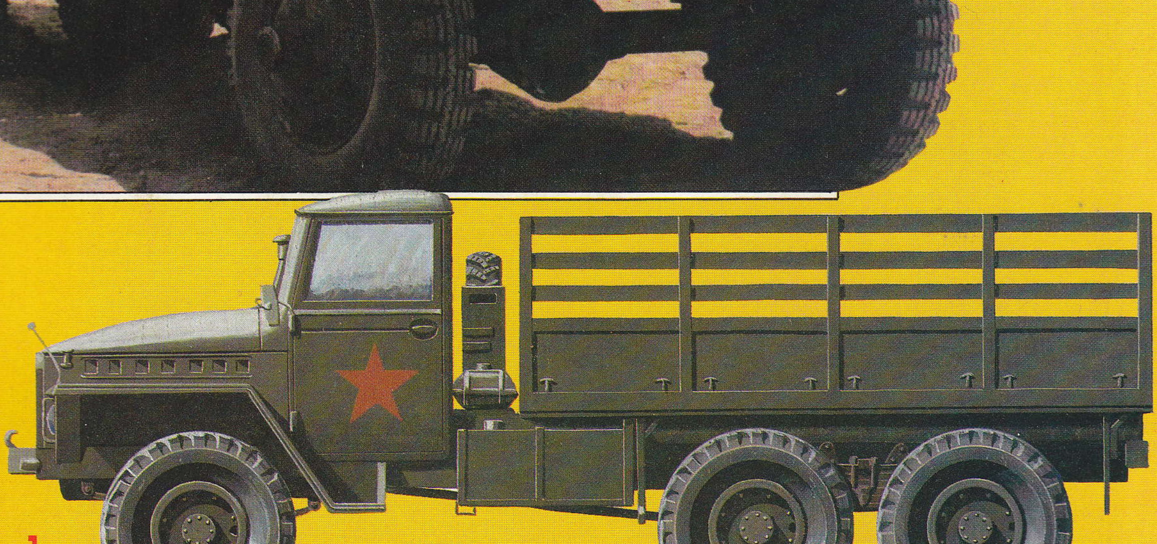

Wheels of War

Desert Ambush

US Army 5-ton Trucks

A fully illustrated guide to Modern 1.5 to 5 Ton Trucks

WAR MACHINE

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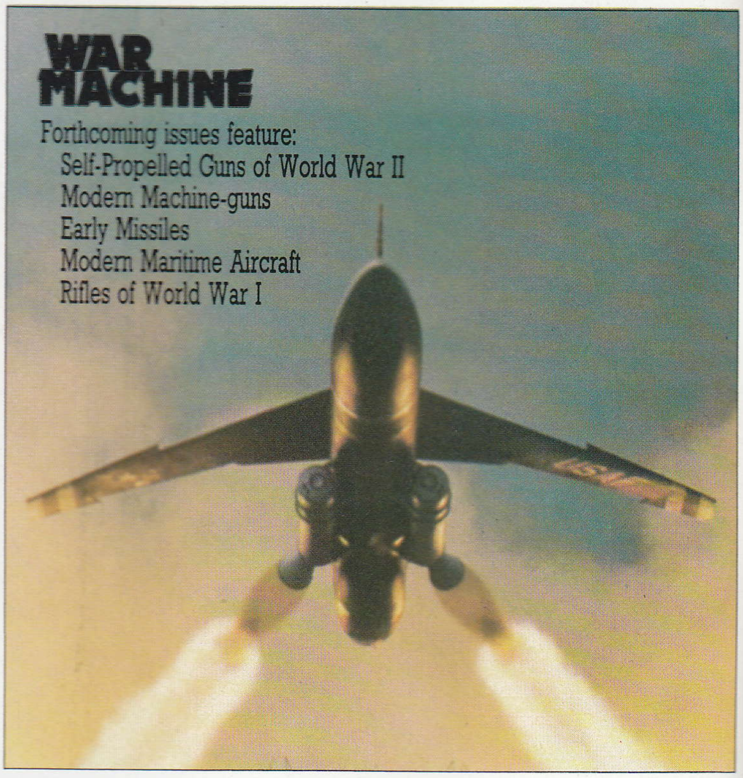

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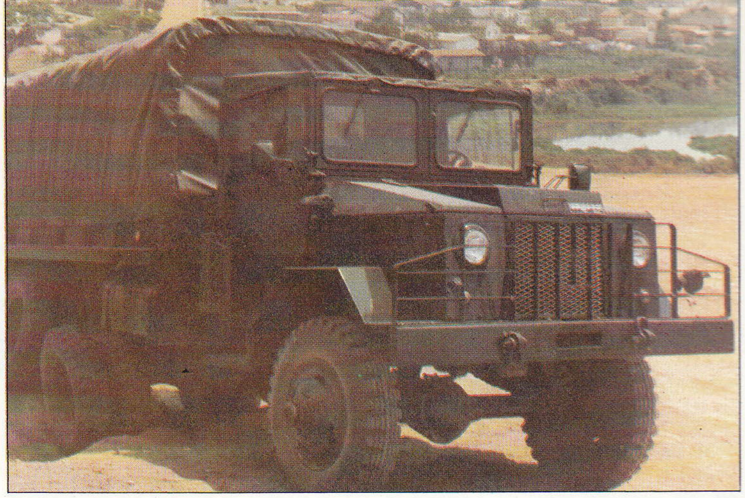
Modern 1.5 to 5 Ton Trucks



This ENGESA EE-25 2500-kg (5,511lb) 6×6 truck shows flexibility of its rear bogies during cross-country operations. The EE-25 can be built with a hydraulic crane for unloading stores, with a front, centre or rear mounted winch, power take-off, and engine-start device for use in cold weather.

Today's mechanized armies require more logistic support than ever before, and if the flow of supplies stops the army itself will soon grind to a halt. Medium trucks bear the greatest share of this burden and must carry their loads in all weathers over rough terrain and into the battle area itself.

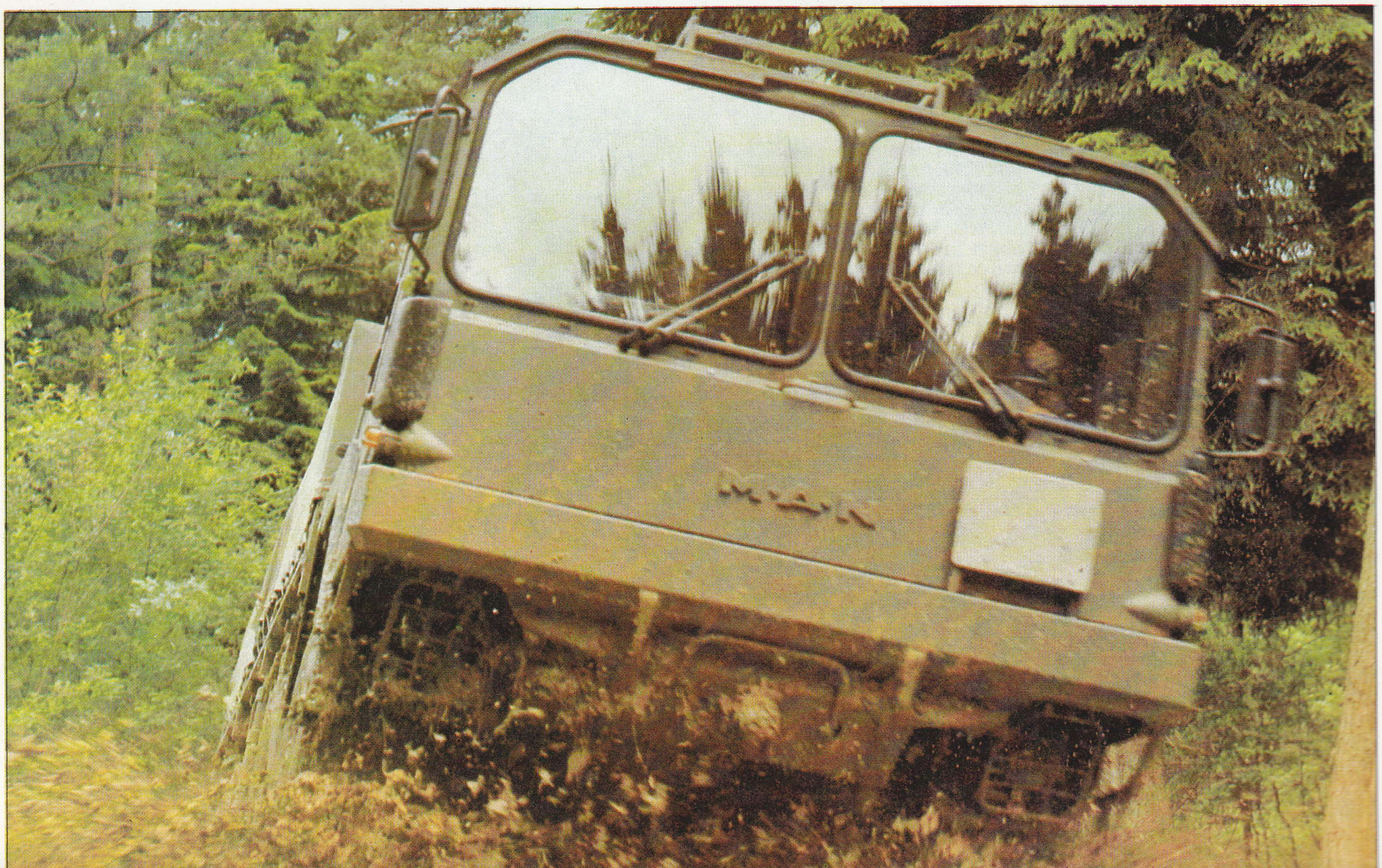
Every army needs a massive number of trucks, not only to carry troops and tow artillery weapons, but also to keep all units provided with the fuel, water, food, ammunition and spare parts they need for their mission. For many years after World War II the 2.5/3-ton truck was the most usual vehicle of this type to be found in most armies, but today it is the 4/5-ton type that is more common.

Some current trucks have been built specifically to meet the requirements of the military, such as the American M35 2.5-ton 6×6 vehicle, but the trend in recent years has been to produce vehicles that at the very least share their major automotive parts (for example engine, transmission, brakes, suspension and cab) with trucks already in volume production for civil applications. Other military trucks are essentially standard commercial vehicles with minimum modifications to suit them for military use, typical features being larger tyres and wheels for greater ground clearance, all-wheel drive for improved cross-country mobility, and a military type rear cargo body. Petrol engines have given way to diesel units, which are considerably more fuel efficient as well as being less likely to catch fire. Many military trucks are fitted with hydraulic cranes to enable cargo to be loaded and unloaded rapidly without any outside assistance, and in many armies cargo is loaded on to pallets for easier handling in the field.

Since the 1950s many countries such as Brazil and Spain have been building up their automotive capabilities, and these nations are now exporters of military vehicles to many parts of the world. Often the same manufacturer is able to supply a complete range of armoured vehicles and military trucks to a foreign army with obvious logistic, economic and training advantages to the operator.

In addition to carrying cargo, trucks are used for a wide range of other roles such as command, field repair, recovery, RPV transport and launch, and mounting weapons systems such as multiple rocket launchers. There is little doubt that if there were no trucks then the most sophisticated army would soon grind to a halt.

One of the West German MAN range of 4×4, 6×6 and 8×8 vehicles is put through its paces. These are all known as Category 1 vehicles and are probably the best trucks of their type in the world. The 8×8 model is used to tow American Pershing and ground-launched cruise missiles.



BRAZIL

ENGESA EE-25 2500-kg 6×6 truck

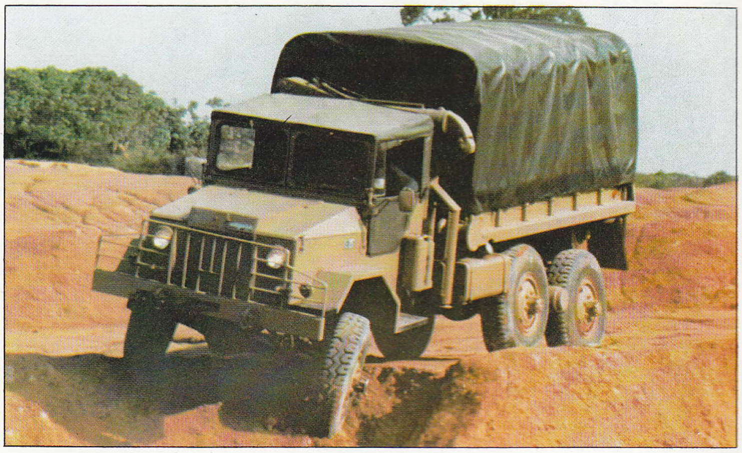
In recent years the ENGESA company has progressed from converting 4×2 and 6×4 vehicles into all-wheel drive vehicles to the design and production of a complete family of wheeled armoured fighting vehicles and trucks. The former include the EE-3 Jararaca 4×4 scout car, the EE-9 Cascavel 6×6 armoured car and the EE-11 6×6 armoured personnel carrier, total sales of these reaching some 4,000 units by 1984. The company's range of trucks includes the **ENGESA EE-15** 4×4, **EE-25** 6×6 and new **EE-50** 6×6 vehicles, all of which are already used by the Brazilian army in addition to countries in South America and the Middle East. The EE in the designation stands for the company name, Engenheiros Especializados, while the digits represent the cross-country carrying capacity of the vehicle: for example, the EE-15 can carry 1.5 tonnes, while the EE-50 can carry 5 tonnes.

The EE-25 6×6 truck has been designed to carry 5000 kg (11,023 lb) of cargo on roads or 2500 kg (5,512 lb) of cargo across country, and is similar in appearance to the standard American 2.5-ton 6×6 trucks, with the engine at the front, three-man cab in the centre, and the cargo area at the rear. The Mercedes-Benz OM-352A diesel is also used in some versions of the EE-9 and EE-11 armoured vehicles, and is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. Steering is power-assisted on the front wheels, and 11.00×20 tyres are fitted all round. The front suspension consists of semi-elliptical springs with hydraulic double-acting shock absorbers, while the rear suspension is of the famous ENGESA Boomerang type with semi-elliptical springs, the whole suspension giving exceptional cross-country mobility compared with that of other vehicles of this type. The rear suspension can have single or dual wheels.

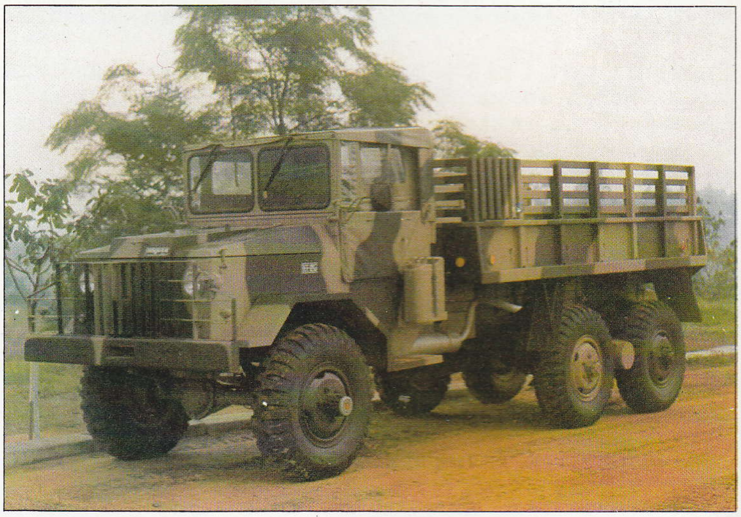
The cab has a vinyl top and doors, which facilitates the air transport of the vehicle, while the rear cargo area has a drop tailgate, bows which can be stowed to the cab rear when not needed, and a tarpaulin cover. If required the EE-25 can be fitted with a supply-loading hydraulic crane with a maximum capacity of 5000 kg (11,023 lb) and a front-mounted winch with a capacity of 3000 kg (6614 lb) and provided with 50 m (164 ft) of cable. Optional equipment includes fire extinguishers, more powerful winches, a power take-off (PTO) and, for use in cold areas, an engine starting aid. A 4×4 model of the EE-25 is available with a similar payload to the 6×6 model. Variants of the EE-25 produced so far include a lubrication vehicle, recovery vehicle, tanker (fuel or water), firefighting truck, prime mover, and fully-enclosed command post or ambulance.

Specification

EE-25
Crew: 1+2
Weights: empty 6800 kg (14,991 lb); loaded (cross-country) 9300 kg (20,503 lb)
Powerplant: one Mercedes-Benz type OM-352A 6-cylinder diesel developing 129.8 kW (174 hp)
Dimensions: length 6.82 m (22 ft 4.5 in); width 2.25 m (7 ft 4.6 in); height (cab) 2.50 m (8 ft 2.4 in)
Performance: maximum road speed 90 km/h (56 mph); maximum range 600 km (373 miles); gradient 60 per cent; side slope 30 per cent; fording 0.9 m (2 ft 11.4 in)



This model of the Brazilian ENGESA EE-25 2500-kg (5,511-lb) 6×6 truck is fitted with single rear tyres. All ENGESA 6×6 vehicles feature the famous Boomerang rear suspension, which ensures that all four of the rear wheels are in constant ground contact, for maximum traction.



The Brazilian ENGESA company first became involved in trucks by the conversion of 4×2 and 6×4 trucks into all-wheel drive for improved cross-country mobility. ENGESA now produces an extensive range of not only 4×4 and 6×6 trucks but also armoured vehicles.

FRANCE

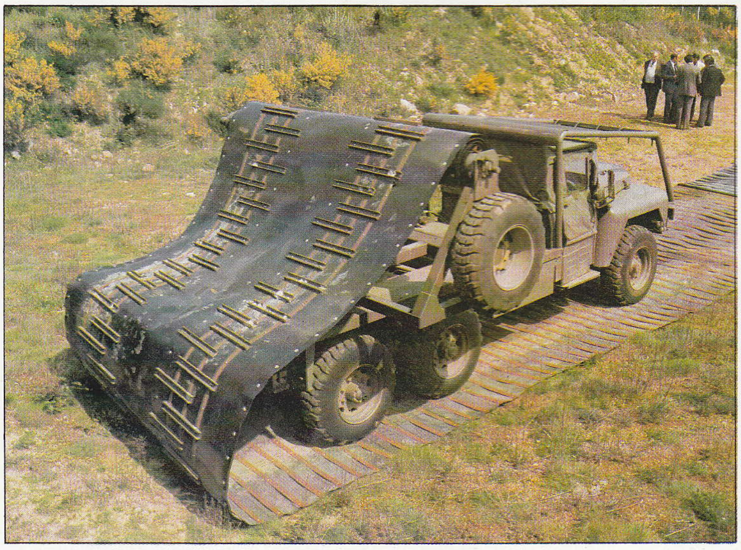
ACMAT VLRA 2500-kg 4×4 truck

For many years the trend has been to adapt a standard commercial vehicle to meet military requirements by the adoption, for example, of all-wheel drive, stronger suspension, bigger wheels, stronger cabs and a special body. The French company ACMAT (Ateliers de Construction Mécanique de l'Atlantique) based at Saint-Nazaire believes that in order to be entirely reliable any military truck must be built to meet the most demanding of military requirements yet must be as simple as possible. The result is the ACMAT range of cross-country vehicles which are now in use with more than 30 countries all over the world.

The basic cargo truck is the **TPK 4.15 SM2**, which can carry 1500 kg (3,307 lb), while the longer-wheelbase **TPK 4.20 SM2** can carry 2500 kg (5,512 lb) of cargo and tow a trailer or artillery piece weighing weight up to 3000 kg (6,614 lb). There is also a long-wheelbase model with slightly greater carrying capacity, and a 6×6 model which can carry a maximum payload of 4300 kg (9,480 lb). The latter model has a slightly more powerful engine, but every version uses the same front axles, wheels, tyres and reduction boxes so that the operator need not keep an extensive range of spare parts for his vehicle fleet. This not only reduces costs but eases training.

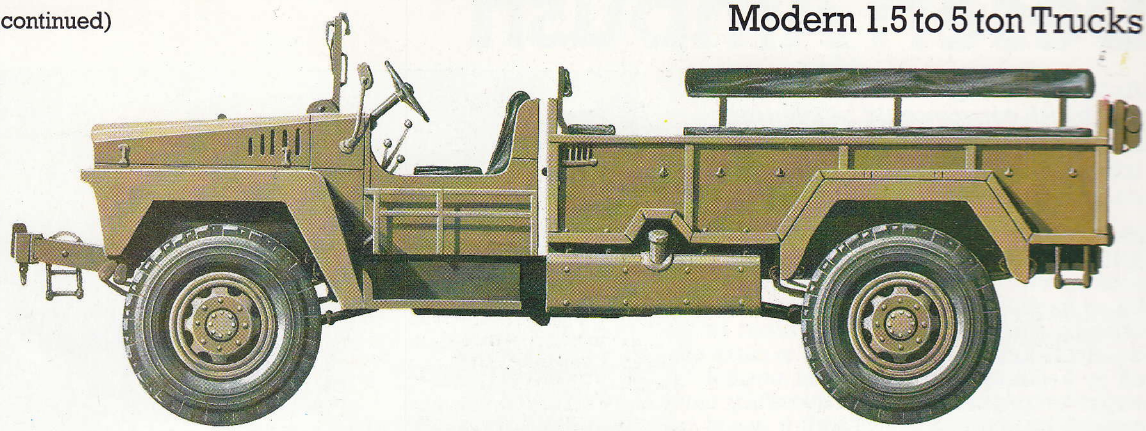
The layout of the ACMAT is conventional, with the engine at the front, the cab in the centre and the cargo area at the rear. The latter has a dropdown tailgate, removable bows and a tarpaulin cover. When the vehicle is used in the troop-carrying role seats can quickly be fitted down the centre or sides of the cargo area. All vehicles have long-range fuel tanks, a 200-litre (44-Imp gal) water tank, sand channels which are considered essential for operations in the desert, and four jerry-cans. Optional equipment includes a front-mounted winch with a capacity of 3000 kg (6,614 lb) a rear towing pintle, power steering, and a wide range of weapons such as a Milan anti-tank missile, a 60-mm (2.36-in) or 81-mm (3.19-in) mortar, a 7.62-mm (0.3-in) or 12.7-mm (0.5-in) machine-gun, or even a twin 20-mm (10.78-in) anti-aircraft cannon system.

There are so many versions of the ACMAT truck that it is possible to mention only a few of them. The com-



One of the many roles of the ACMAT VLRA TPK 6.40 SM2 6×6 truck is that of laying a portable roadway over soft terrain so that following trucks can cross without becoming bogged down. The cargo model of this truck can carry a maximum payload of 4300 kg (9,480 lb).

mand and control vehicle is the **TPK 4.20 VCT**, and this is fitted with extensive communications equipment. The TPK 4.20 chassis can be used as a light recovery vehicle, or as a firefighting vehicle or as a bowser (fuel or water). It can also be fitted with many box bodies/shelters for use in specialized roles. The chassis is also used as the basis for an armoured car/armoured personnel carrier. The 6×6 TPK 6.40 SM2 can also be used for many other roles including recovery, portable roadway laying, tar spreading, tipping, and as a bowser.



The French ACMAT VLRA range of 1500-kg (3,307-lb) cross-country trucks are used by more than 30 countries around the world and have established a reputation for reliability and durability. Their 240-litre (53-gal) fuel tanks give a range of 900 km (560 miles).

Specification
TPK 4.20 SM2
Crew: 1+2
Weights: empty 4300 kg (9,480 lb); loaded (cross-country) 6800 kg (14,991 lb)
Powerplant: one Perkins Model 6.354.4 diesel developing 89.5 kW (120 hp)
Dimensions: length 6.00 m (19 ft 8.2 in); width 2.07 m (6 ft 9.5 in); height (cab) 1.83 m (6 ft 0 in)
Performance: maximum road speed 100 km/h (62 mph); maximum range 1600 km (994 miles); gradient 60 per cent; side slope 30 per cent; fording 0.9 m (2 ft 11.4 in)

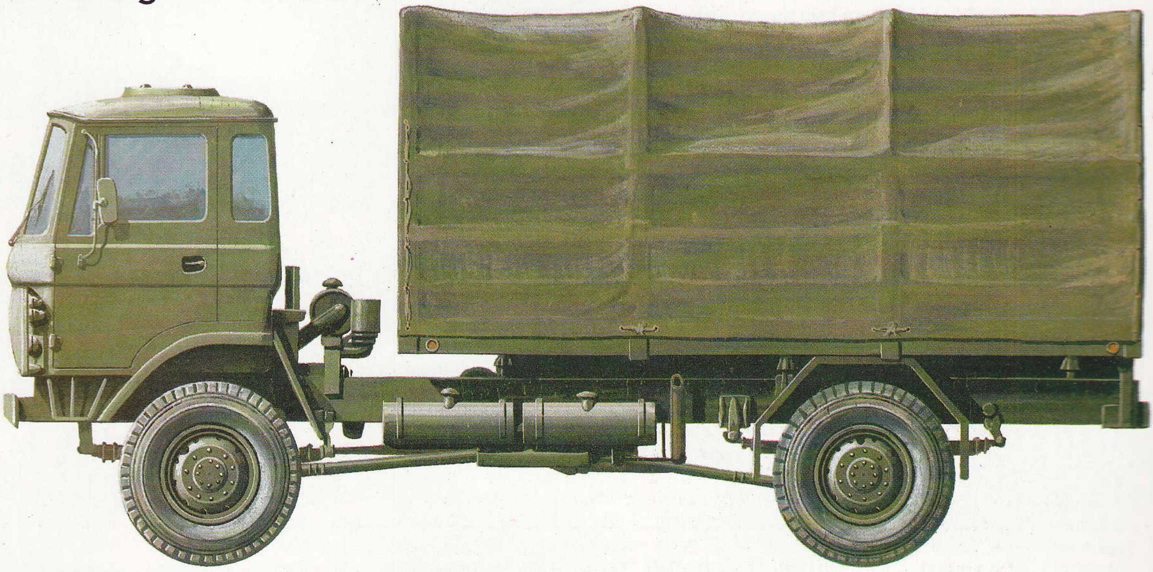
NETHERLANDS

DAF YA 4440 4000-kg 4×4 truck

In the 1950s DAF designed a complete family of cross-country vehicles to meet the requirements of the Dutch army. These included the **YA** 4×4 weapons carrier, the **YA 314** 4×4 and **YA 328** 6×6 3000-kg (6,614-lb) trucks, and the heavy **YA 616** 6×6 6000-kg (13,228-lb) truck. The trucks are now being replaced by two new DAF designs which are based on vehicles already in production for civil applications. These are the **DAF YA 4440** 4×4 4000-kg (8,818-lb) and **YAZ 2300** 6×6 10000-kg (22,046-lb) trucks, both of them featuring more fuel efficient diesel engines and ZF hydraulic steering.

The Dutch army placed its first order for 4,000 YA 4440 trucks in 1976, and all of these were delivered between 1977 and 1980; since then a further 2,500 vehicles have been supplied. The all-steel forward control cab has a reinforced roof so that a 7.62-mm (0.3-in) machine-gun can be installed for anti-aircraft defence, and this cab can be tilted forward to allow access to the engine and transmission for maintenance. The rear cargo area has side boards and a tailgate that can be quickly removed to allow containers and other bulk cargo to be loaded; bows and a tarpaulin cover are also provided. The engine is coupled to a manual transmission with five forward and one reverse gear and a transfer case. Suspension, front and rear, consists of semi-elliptical springs and double-acting hydraulic shock absorbers.

The normal version has a single passenger seat, but if required the vehicle can be delivered with a two-man passenger seat. Other optional equipment includes a 1000-kg (2,205-lb) manually-operated crane and an automatic transmission. The Dutch army has also taken delivery of 375 examples of a version fitted with a larger four-man cab for driver training purposes. In forward areas it is often difficult to find cranes and other mechanical handling equipment to unload trucks, so the Dutch army has also taken delivery of 200 vehicles fitted with a HIAB hydraulic crane to the cab rear. This can be used to either side of the vehicle, though stabilizers have to be lowered to the ground before the crane is used. The Dutch army and navy also use the **DAF YA 5441/5442** 4×4 5000-kg (11,023-lb) cargo truck, which uses many components of the DAF YA 4440. This model does not have the cross-country mobility of the earlier vehicle.



A DAF YA 4440 4000 kg (8,818 lb) cargo truck with bows and tarpaulin cover in position at the rear. Like most military trucks today, the YA 4440 is essentially a standard civilian truck with a few modifications to suit it for military use.

Specification
YA 4440
Crew: 1+1
Weights: empty 6900 kg (15,212 lb); loaded (cross-country) 10900 kg (24,030 lb)
Powerplant: DAF DT 615 6-cylinder turbocharged diesel developing 114.1 kW (153 hp)
Dimensions: length 7.19 m (23 ft 7.1 in); width 2.44 m (8 ft 0 in); height (tarpaulin cover) 3.42 m (11 ft 2.6 in)
Performance: maximum road speed 80 km/h (50 mph); maximum range 500 km (311 miles); gradient 50 per cent; side slope 30 per cent; fording 0.9 m (2 ft 11.4 in)

Today the Dutch army is replacing its 1950s generation vehicles with a whole new series built by DAF. Over 6,500 of these DAF YA 4440 4000-kg (8,818-lb) trucks are now being delivered. The model on the left is fitted with an HIAB crane for handling pallets.

Desert Ambush

As it jolted along the rocky Omani track, the British convoy could be seen for miles. Armed to the teeth, the rebel tribesmen watched from the hills as the column drew closer and closer.

Most people who spent time in the post-war British army developed a love/hate relationship with the ubiquitous 3-tonner. It could be an incredibly welcome sight as it arrived bringing spares and supplies; it could be an equally hateful sight as it arrived to carry one off to a particularly unpleasant position. It would be praised when it successfully navigated a stretch of stony desert; it would be cursed when it bogged down on a jungle track miles from anywhere. Probably no truck in the world could have successfully stood up to all the demands made on the poor old 3-tonner by unit commanders and drivers alike. The 3-tonner simply was as much a fact of military life as incomprehensible orders or a good posting. If the breaks came your way you enjoyed them, and if they did not you simply put up with them. There was nothing intrinsically exciting about the 3-tonner, in the same way that there is about a tank, a new weapons system or even the latest radio set. This is slightly unfair, because men and materials have to be transported in order for battles to be won or (hopefully) prevented: it might not be glamorous, but the 3-tonner and the men who drove it were, and still are, as important to the British army as any other piece of kit.

Although air power played a major part in the Radfan operations, much of the men and supplies were brought up by truck. Here infantry set up recoilless rifles and 7.62-mm Machine-Guns while a Bedford RL 4×4 truck unloads supplies in the background.

Cross-country driving

There is one question that anyone who has spent time in the British army will remember either being asked or asking: 'Do you think we can get a 3-tonner down there?' 'Down there' was anything from a bog on Dartmoor, to a wadi strewn with the largest and sharpest boulders in the Middle East, or a track running through a particularly dense patch of secondary jungle. The 3-tonner (and its driver) was expected to be able to go anywhere and do anything, much to the subsequent fury of command workshops personnel when yet another 3-tonner was towed in for a complete overhaul, or simply reported as having been abandoned when it started to sink into mud or sand up to and over its mudguards. Possibly the standing order that the driver of a disabled vehicle should stay with it was designed to make drivers think before they asked the impossible of their vehicle: no one likes spending the night by himself in the middle of the jungle with only the mosquitoes and an occasional tiger for company. That standing order is only operative in peacetime, incidentally; in battle conditions not even Whitehall expects someone to stay near a burnt-out hulk, or even stay inside a 3-tonner while bullets and mortar shells are zeroing in on it. Although slightly armoured and often carrying a mounting for a machine-gun, the 3-tonner was not actually a fighting vehicle, but in the past 30 or so years it has probably been on the receiving end of more enemy bullets and shells than any tank. So it is worth taking a look at the 3-tonner 'in action'. As usual, the poor old thing is on the receiving end. It is a shame, in a way, that it was never fitted out as a rocket launcher in the Soviet fashion (and as also used to great effect by the Viet Cong against the French, the South Vietnamese army and the Americans), for it would have been nice for the British 3-tonner to have had its own moment of glory. (The exceptions are the 'portées' used in the Western Desert in World War II by the SAS, LRDG etc.: these trucks were fitted with anti-tank guns, firing over the cab.)

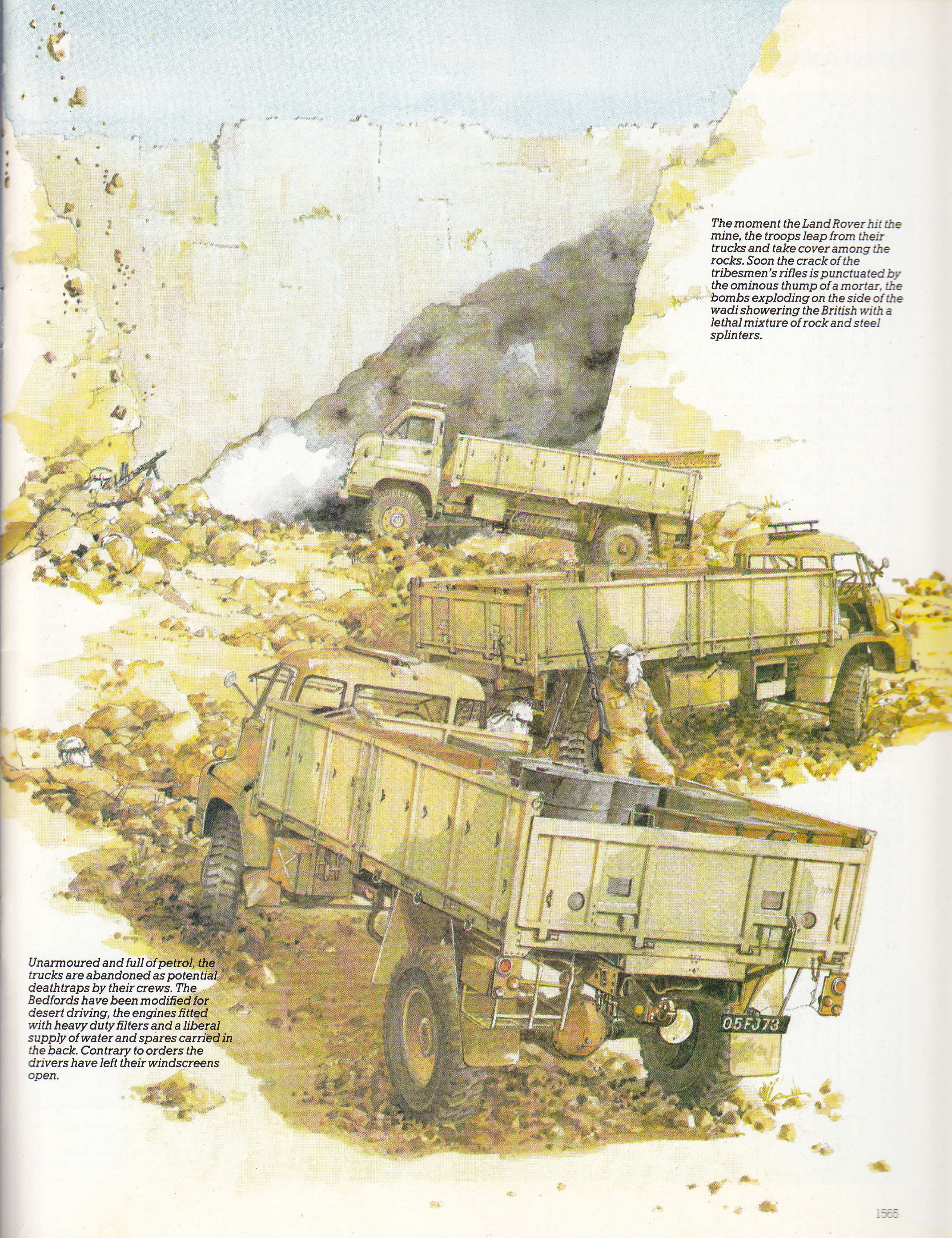
The federation of semi-autonomous states now known as the United Arab Emirates used to be known as the Trucial Oman States. Until 1973 they owed their allegiance to the Sultan of Oman, though under the protection of the British government through a series of treaties going back to the last century. Sharjah was an extremely important RAF staging post, and the neighbouring emirate, Dubai, acted as an entrepot port for the entire region. Supplies for the British forces (mostly the Special Air Service) helping the Omanis fight their own rebels (some tribal, some Soviet-inspired) often passed through these two towns, now sizeable modern cities. Both Dubai and Sharjah also provided sea and air cargo facilities for the Trucial Oman Scouts (British officers and senior NCOs) who did such an excellent job in preserving the stability of the region until independence.

The mountain tribes

Thus it is interesting to look at a military convoy from Dubai en route to a destination in Oman. This is not the famous convoy that, in 1963, carried two pedigree bulls to upgrade the Omani herds, but one carrying men and equipment, and well aware that it could be ambushed en route by a party of desert Bedu, out for a little harmless fun (they call it a *razziah*, from which comes the English expression 'going on the razzle'); or by tribesmen loyal to the 'mad' Mahdi, secure in his fastness on the Green Mountain; or by anybody who had an interest in destabilizing the region. The convoy consists of four 3-tonners and three accompanying Land Rovers, equipped for desert combat. The driver in the lead 3-tonner is the most experienced and is best able to decide if his truck can safely go over difficult terrain. Like all the other drivers he has an open windscreen, which is against orders, but a fraction cooler. To keep the dust out of his eyes he is wearing army-issue sand goggles; and around his head he is wearing the standard arab headress, or *keffiah*, which is still the most practical and comfortable garb to wear in the desert. His vehicle has, so far as possible, been 'customized' for the Middle East: the engine well cleaned (oil and grease attract sand), essential protection taken against dust (heavy-duty air filters etc.), and with long-range petrol tanks, and jerrycan upon jerrycan of water provided.

Night bivouac

For the first 48 km (30 miles) or so the route runs through stony desert, which presents no real problem: the tyres are thick enough to withstand most of the sharp flints or rocks, and the track is reasonably smooth. Any sand dunes are given a wide berth. Soon, however, the stony desert gives way to a flat plain of whitish sand, and here the drivers must be extremely careful: the ground may appear solid enough, but in fact they are driving over a salt marsh. If they stay on the track well and good, but the slightest deviation can mean the truck will break through the surface crust and become hopelessly mired. This is an area that even camels sometimes have difficulties in traversing. The convoy is making for a range of sharply rugged mountains that looms out of the heat haze in the distance. Mostly impregnable, the mountains can be crossed by following dried-up river beds (wadis), and it is one such wadi that is reached shortly before dusk. The convoy bivouacs for the night. Guards are posted, but neither drivers nor troops are encouraged to sleep in their vehicles: they might provide a modicum of protection against scorpions and spiders, but they can also be deathtraps if a well-placed mortar bomb explodes on or even close by one.



The moment the Land Rover hit the mine, the troops leap from their trucks and take cover among the rocks. Soon the crack of the tribesmen's rifles is punctuated by the ominous thump of a mortar, the bombs exploding on the side of the wadi showering the British with a lethal mixture of rock and steel splinters.

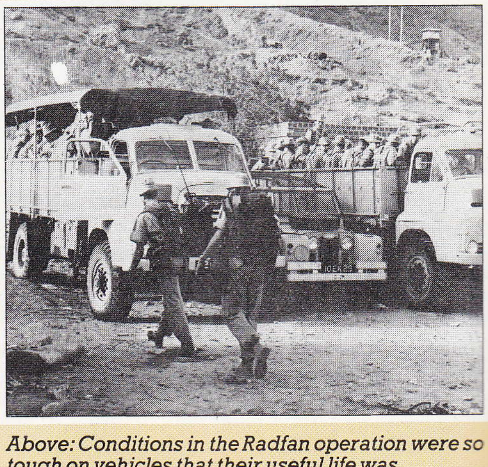
Unarmoured and full of petrol, the trucks are abandoned as potential deathtraps by their crews. The Bedfords have been modified for desert driving, the engines fitted with heavy duty filters and a liberal supply of water and spares carried in the back. Contrary to orders the drivers have left their windscreens open.

Come first light and the convoy starts its slow, tortuous way along the wadi. Here the large tyres prove a mixed blessing: on the one hand they do enable the truck to clear large boulders, but on the other they play havoc with the 3-tonner's centre of gravity, so that a sudden lean to the left or right can result in the truck toppling over, or veering out of control into a large boulder that could just fracture its radiator. Gradually the walls of the wadi get steeper and steeper. The lead driver is possibly wondering how much longer it will be before they find the valley that will finally take them through the mountains, if only because this is an ideal place for an ambush. And just as he thinks that his Land Rover hits a mine and disintegrates in a shower of broken metal and bodies.

Short of sending a party of engineers in front with mine-detection equipment, there was no way of spotting such a mine: small rocks and boulders prove the ideal camouflage. The only problem now is whether the mine had been laid as a singleton or as part of a small field. And is it part of an ambush? A burst of small arms fire that rips into the convoy as a whole settles the latter question, and the Immediate Action ambush drill takes over. Obviously the convoy cannot go forward, as the way is blocked by the flaming wreckage of the lead Land Rover. No more can the convoy retreat: there is no place to turn round, and reversing out of an ambush at a top speed of around 3.2 km/h (2 mph) is an action not calculated to save lives. (Wadi driving is notoriously slow.)

Everyone gets out of the 3-tonners at top speed. The small arms fire is coming from the convoy's left, high up on the mountain side, so the officers and NCOs get their men as fast as they can to the left bank where they can get some protection. One or two soldiers may try and stay on the right side of the wadi, keeping their vehicles between them and the enemy, which is as good an invitation to being killed in action as you could find: when those long-range petrol tanks explode, as they are quite likely to, they will incinerate anyone within at least 18.3 m (20 yards). The navy may be prepared to go down with its ships, but the army has always been less sentimental about its trucks. So the idea is to get out and get as far away as is practical without bunching in the process, because one well-aimed mortar round (or one lucky mortar round) is all it takes to wipe out a closely bunched platoon. Almost upon cue a sharp crack, followed by an explosion and a shower of rock fragments, signals that there is indeed a mortar. It is zeroed on the convoy, and no ranging shots are necessary for the column of vehicles has driven directly into the killing ground, and the chances are that very few of them will be able to drive back. Ambush Immediate Action drill in the jungle calls for the ambushed party to charge the ambushers. It is not as heroic or foolhardy as it sounds: you will probably get killed if you stay where you are anyway, and a reasonably well disciplined charge stands every chance of getting you to close quarter grips with the enemy, where your superior (in theory) training and fitness should give you the advantage. The same does not hold true for this situation, of course, since it is a little difficult to charge up a mountain side. The rebels, whoever they are, have picked their ambush site extremely well. Obviously the convoy or what is left of it (a well planned ambush should kill or incapacitate at least 50 per cent of the trapped party within the first five minutes) cannot stay where it is. Even though fire is now being returned by rifle and Bren gun and a few sharpshooters have somehow managed to find themselves natural 'sangars' from which to fire well-aimed shots at their attackers, the situation is basically intolerable. The opposing mortar is firing from a point up ahead, from the other side of a sharp bend in the course of the wadi, and there is, thankfully, very little fire coming from the rear. The convoy commander estimates that there are at most two or three riflemen posted there to prevent an escape. This is in itself slightly puzzling, because a good ambush commander will site some of his strongest firepower at the rear of the ambush simply to prevent an escape. It could be that there is a larger force there, waiting silently to cut them to ribbons if they try to retreat the way they came; this is highly unlikely, however, because though the rebels in this part of the world may be extremely brave they are not disciplined and, once the firing starts, they all open up with everything they have got. The final clue comes from the behaviour of the mortar firing against them. It is being laid (and well laid) to explode its bombs on the mountainside above the sheltering soldiers, so that they are being bombarded with rock fragments every bit as lethal as any bullet ricochet. Those trucks, that should be such superb sitting targets, are being studiously left alone. Obviously the attacking force wants the trucks and especially their contents. The commander really has only one decision to make. Although a radio was salvaged and he has managed to signal the British position, help will not arrive for at least three hours. And as soon as the attackers realize that help is on its way, they will destroy the 3-tonners anyway, on the basis that if they cannot have them, no one can. Under covering fire, the commander orders the retreat, and is not surprised to see the enemy fire slacken as his men slither and crawl their way to safety. With the bulk of his men safely (he hopes) out of the killing ground, only one thing remains to be done: a few well thrown grenades plus a quick burst from the Bren gun, and the 3-tonners explode, their smoke and flames providing a very useful cover for the escape. It is not quite the same thing as shooting your own horse to deny it to the enemy, but even so the commander and his men feel a slight twinge of regret as the four trucks they had so carefully shepherded this far burn down to their wheel rims. The trucks and their contents were on the commander's signature, and while no one is going to make him pay for them, they are going to ask him an awful lot of questions. Anyway, there is plenty of time to think of that on the long trek back. With any luck, HQ will send a couple of 3-tonners out to pick them up, so they will not have to walk too far. In a way the 3-tonners got the commander and his men into this mess, so it is only fitting that 3-tonners should get them out again.

Left: A Bedford RL 4×4 truck creates a dust cloud to its rear as it moves along a track in the Radfan. The Royal Engineers had to clear a path across the rocky terrain before the trucks could get through, and even then progress was often slow due to many punctures.



Above: Conditions in the Radfan operation were so tough on vehicles that their useful life was measured in months rather than years. Many vehicles were fitted with special protection against mines.

ITALY

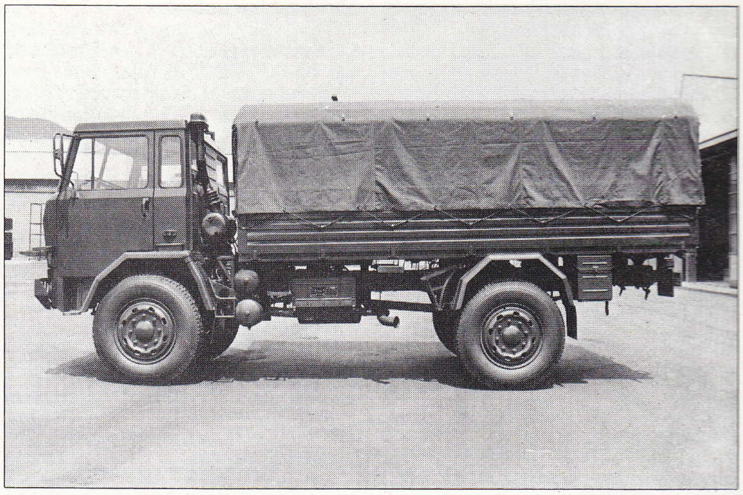
FIAT 90 PM 16 4000-kg 4×4 truck

For many years FIAT has supplied the majority of wheeled tactical vehicles required by the Italian army. The latest military trucks from this source are the **FIAT 75 PM** 2500-kg (5,512-lb) 4×4 and the **FIAT 90 PM** 4000-kg (8,818-lb) 4×4 vehicles. Production of both is undertaken at the FIAT plant at Bolzano in northern Italy. The first figure in the designation is the approximate gross vehicle weight, while the P stands for *Pesante* (heavy-duty service) and the M for *Militare* (military). So far the Italian army has ordered almost 4,000 vehicles and Somalia some 120.

In addition to carrying 2500 kg (5,512 lb) of cargo, the FIAT 75 PM can also tow a trailer or weapon weighing up to 4000 kg (8,818 lb). As far as it is known, the Fiat 90 PM 16 truck has yet to enter service with the Italian army, although a small quantity of the basic cargo version has been supplied to Somalia, while Venezuela has taken delivery of 60 models fitted with a 5000-kg (11,023-lb) crane by FARID of Italy.

The fully enclosed cab is of the forward control type, and can be tilted forward to allow access to the engine for maintenance purposes. In the cab roof on the right side is a circular observation hatch, and on this a 7.62-mm (0.3-in) machine-gun can be fitted for anti-aircraft or local defence. The all-steel rear cargo area has drop sides and a tailgate which can be removed if required, bows and a tarpaulin cover. When used in the troop transport role, the vehicle can be fitted quickly with seats. The engine is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. Most vehicles of this type normally have their front axle disengaged when being driven on roads to make them 4×2 rather than 4×4 vehicles. The suspension, front and rear, consists of leaf springs with hydraulic telescopic shock absorbers. The brakes are of the dual-circuit air type, the parking brake being mechanical. Optional equipment includes an air-operated lockable front differential and a front- or rear-mounted winch with a capacity of 4000 kg (8,818 lb).

Some years ago the company built a halftrack model of the FIAT 90 PM 16 called the **HT 90**. This had its rear wheels replaced by a complete halftrack system similar to that fitted to American halftracks of World War II, but did not progress past the prototype stage. The British company Laird has built prototypes of a similar halftrack multi-role vehicle called the Centaur. This is a long-wheelbase Land Rover chassis fitted with a halftrack system on each side in place of the rear axles. The Centaur has been tested by the British army and evaluated by a number of countries in the Middle East, but has yet to enter volume production.



The FIAT 90 PM 16 4000-kg (8,818-lb) truck is a member of a complete range of trucks developed at the Lancia plant in Bolzano, northern Italy, for civil and military roles. The smaller FIAT 75 PM, with a payload of 2500 kg (5,511 lb), is already in service with the Italian army.

Specification

FIAT 90 PM 16

Crew: 1+1

Weights: empty 5750 kg (12,677 lb); loaded (cross-country) 9750 kg (21,495 lb)

Powerplant: one FIAT Model 8062-24 6-cylinder supercharged diesel developing 119.3 kW (160 hp)

Dimensions: length 6.352 m (20 ft 10.1 in); width 2.30 m (7 ft 6.6 in); height 2.935 m (9 ft 7.6 in)

Performance: maximum road speed 80 km/h (50 mph); maximum range 700 km (435 miles); gradient 60 per cent; side slope 30 per cent; fording 0.85 m (2 ft 9.5 in)

FINLAND

SISU A-45 3000-kg 4×4 truck

When the Finnish army drew up its requirement for a 4×4 vehicle capable of carrying 3050 kg (6,724 lb) of cargo across country or 4050 kg (8,929 lb) of cargo on roads, it was natural that SISU-Auto AB of Helsinki would be approached as the company is totally familiar with the demanding requirements of Finland's climate and terrain. The result was the **SISU A-45** truck, which meets all of the Finnish army's requirements and has also been adopted for a number of civil applications. The forward control cab is unusual in that its lower part is made of steel while the detachable upper part is fabricated of glassfibre, enabling the vehicle to be prepared quickly for air transport. This is of some importance as Finland has on many occasions sent contingents of troops overseas to operate as part of United Nations' peacekeeping forces. The engine is under the cab and projects a short distance into the rear cargo area, and is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. Steering is power-assisted on the front wheels, and tyres are 14.00×R20 all round. The suspension front and rear consists of semi-elliptical leaf springs with shock absorbers for the front axles only.

The rear cargo body is of all-steel construction and attached to the chassis by special rubber mountings for greater flexibility. The sideboards and tail gate can be folded down to assist in the loading of cargo, and the tailgate is provided with inbuilt access steps.

Optional equipment for the SISU A-45 truck includes a hydraulic winch with a capacity of 6500 kg (14,330 lb) and 60 m (197 ft) of cable which can be used to the front or rear of the vehicle for self-recovery or to recover other vehicles that have become bogged down. A blowlamp-operated coolant and oil-sump heater is provided for use in very cold conditions such as those encountered in Finland, while the basic vehicle is fitted with a cab heater. One of the more unusual options for this truck is a hydraulic take-off for any towed trailer or artillery weapon: for example, if a two-wheel trailer is being towed the whole truck/trailer combination has a 6×6 configuration and greater cross-country mobility. The basic A-45 truck can tow a maximum load of 2000 kg (4,409 lb) across country, or 4000 kg (8,818 lb) on roads.

The latest SISU truck to enter service with the Finnish army is the **SA-150 VK** 4×4 vehicle, which can carry a maximum payload of 6400 kg (14,110 lb) and is fitted with a 8000-kg (17,637-lb) capacity winch. Components of this truck are also used in the new Finnish SISU XA-180 6×6 amphibious armoured personnel carrier, which has recently entered service with the Finnish army.

Specification

A-45

Crew: 1+2

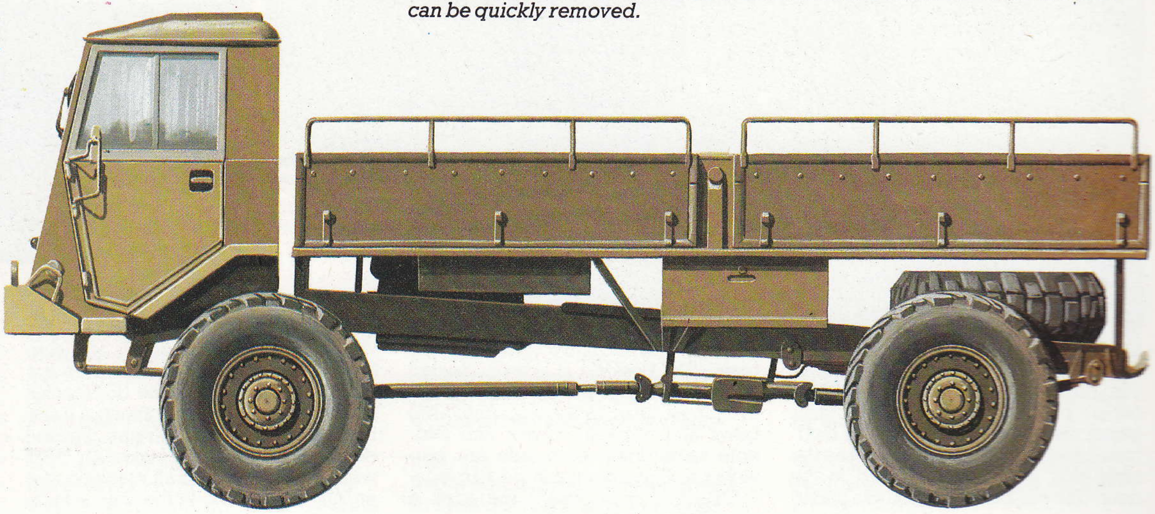
Weights: empty 5950 kg (13,118 lb); loaded (cross-country) 9000 kg (19,842 lb)

Powerplant: one 6-cylinder diesel developing 96.9 kW (130 hp) or turbocharged diesel developing 119.3 kW (160 hp)

Dimensions: length 6.00 m (19 ft 8.2 in); width 2.30 m (7 ft 6.6 in); height (cab) 2.60 m (8 ft 6.4 in)

Performance: maximum road speed 100 km/h (62 mph); maximum range 700 km (435 miles); gradient 60 per cent; side slope 30 per cent; fording 1.0 m (3 ft 3.4 in)

This SISU A-45 4×4 cargo truck has sideboards and a tailgate that can be lowered to enable the rapid loading and unloading of cargo by fork lift trucks. To facilitate air transport the upper part of the fully enclosed three-man cab can be quickly removed.



SWEDEN

Saab-Scania SBA 111 4500-kg 4×4 truck

Many countries today base their military vehicles on a standard civil chassis to which are grafted all-wheel drive, larger wheels and tyres, a more powerful engine and military-type cargo area. The terrain over which the Swedish army would be required to operate in time of war is so severe, however, that a decision was taken to design a new family of cross-country vehicles in the early 1960s. In the end Volvo designed the lighter 4×4 and 6×6 vehicles, while Saab-Scania designed the heavier vehicles. First prototypes were completed in 1971 and after the usual trials and modifications, effected at the request of the operator, production got under way at Saab-Scania's Söndertälje facility in 1976. About 2,500 vehicles were produced for the Swedish army, navy and air force by the time production was completed in early 1982. Finland took delivery of 33 SBAs, and a quantity was also built for civil use.

The family comprises two vehicles, the **Saab-Scania SBA 111** 4×4 truck and the **SBAT 111S** 6×6 truck, with both vehicles sharing many common components. The SBA 111 can carry 4500 kg (9,921 lb) of cargo across country and 6000 kg (13,228 lb) on roads, while the SBAT 111S can carry 6000 kg (13,228 lb) of cargo across country and 9000 kg (19,842 lb) on roads. The main difference between the two vehicles is that the 6×6 model is powered by a supercharged version of the D11 that develops 296 hp (220.7 kW).

The all-steel two-door forward control cab is much stronger than that fitted to many military vehicles, and will protect the crew even if the vehicle turns over. This cab can be tilted forward at an angle of 55° for access to the engine. The latter is coupled to an automatic gearbox and a two-speed transfer case. Suspension consists of semi-elliptical springs and double-acting hydraulic shock absorbers, and the steering is of the hydraulic type essential for operations over terrain such as that encountered in Sweden.

The rear cargo area has drop sides and a drop tailgate (quickly removable to enable bulk cargo to be carried) as well as removable bows and a tarpaulin cover. Both the 4×4 and 6×6 vehicles have a hydraulic winch with a capacity of 8000 kg (17,637 lb) which can be used to the front or rear of the vehicle, and many have a 1500-kg (3,307-lb) hydraulic crane for unloading purposes.

The Swedish army uses the SBAT 111S to tow the Bofors 155-mm (6.1-in) FH-77A howitzer, and this model is fitted with a fully enclosed compartment to the rear of the cab to carry the gun crew, while another 6×6 vehicle carries additional ammunition. Other versions of the 6×6 model include a crash rescue vehicle for use at airfields, another to carry the Giraffe radar system for use with the RBS-70 surface-to-air missile system, and a 4×4 model used for clearing snow at Swedish airfields.

Specification

SBA 111

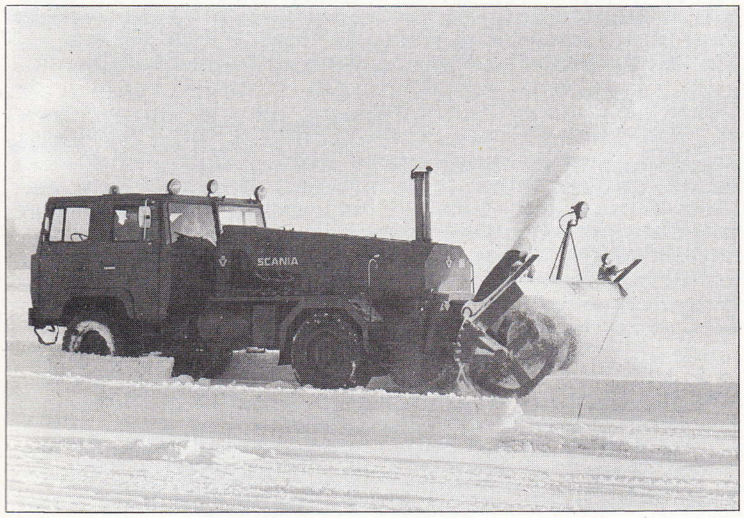
Crew: 1+1

Weights: empty 9150 kg (20,172 lb); loaded (cross-country) 13700 kg (30,203 lb)

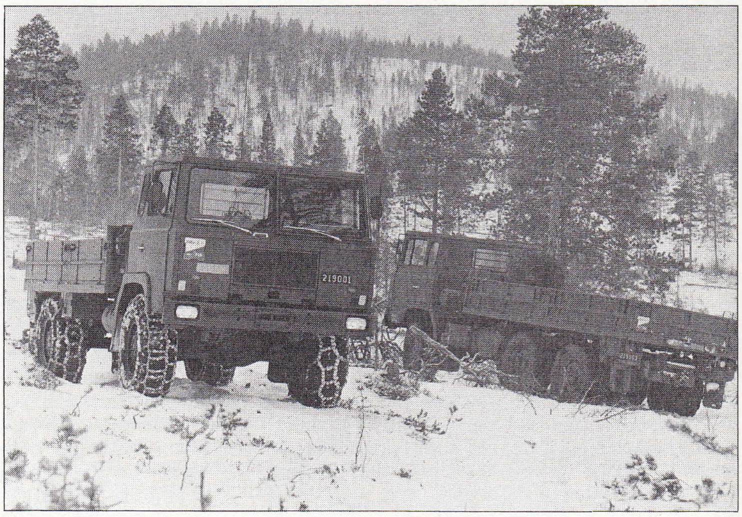
Powerplant: one D11 6-cylinder diesel developing 164.1 kW (220 hp)

Dimensions: length 6.75 m (22 ft 1.75 in); width 2.49 m (8 ft 2 in); height (cab) 2.90 m (9 ft 6.2 in)

Performance: maximum road speed 90 km/h (56 mph); maximum range 600 km (373 miles); gradient 60 per cent; side slope 40 per cent; fording 0.8 m (2 ft 8.5 in)



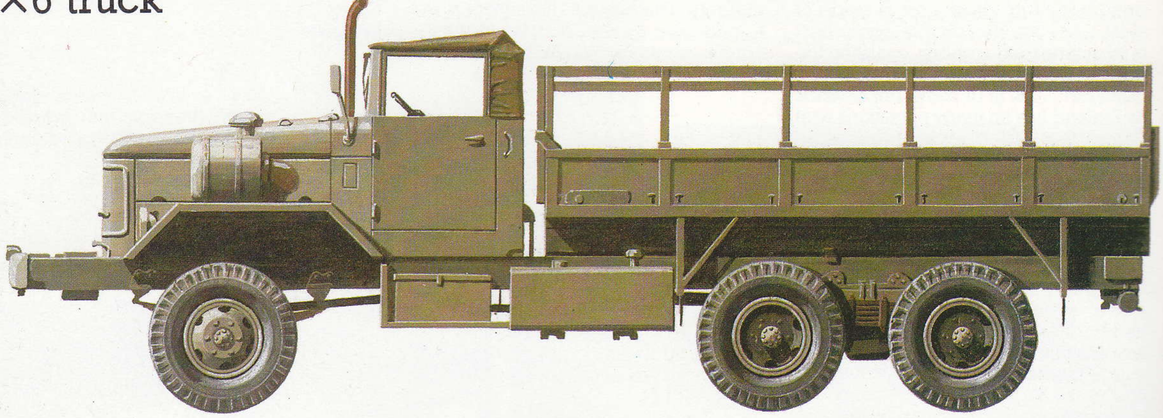
To meet the requirements of the Swedish air force, Saab-Scania have built a special snow-clearing model of the SBA 111 4500-kg (9,921-lb) truck. This is fitted with a ROLBA 1500S snow-clearing system and is driven backwards when clearing snow.



Between 1976 and 1982 Saab-Scania delivered 2,500 of the SBA 111 4500-kg (9,921-lb) and SBAT 111S 6000-kg (13,227-lb) trucks to the Swedish armed forces. These share many common components, the major difference being that the D11 engine of the SBAT 111S is supercharged.

USA

M813 5-ton 6×6 truck



The M813 5-ton 6×6 cargo truck is a further development of the M54 series developed in the 1950s. Until the introduction of the new M939 series of 5-ton trucks, the M813 was the standard vehicle in its class in both the US Army and Marine Corps.

The most widely used trucks in the modern US Army are the 2.5- and 5-ton 6×6 series. The first range of 5-ton trucks to be completed after the end of World War II was the **M54** series, which was built by a number of manufacturers including Diamond T, Kaiser Jeep (later AM General), Mack and International Harvester. Further development of the M54 series resulted in the **M809** family which entered production at AM General in 1970 for a total amounting to well over 40,000 vehicles (home and export markets) by 1985.

The basic chassis is the M809, while the standard cargo truck is the **M813**, which can carry 4536 kg (10,000 lb) across country or 9072 kg (20,000 lb) on roads, the towed loads being 6817 kg (15,030 lb) and 13608 kg (30,000 lb) respectively. The layout of the vehicle is similar to that of the M35, the major distinguishing features (apart from the difference in size) being the air cleaner on the left mudguard and the high exhaust pipe on the right side of the cab forward of the door. The engine is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. The steering is power-assisted on the front wheels. The rear cargo area has drop tailgate, removable bows and tarpaulin cover, and foldable seats down each side are provided so that troops can be carried.

Optional equipment includes a deep fording kit which enables the vehicle to wade to a depth of 1.98 m (6 ft 6 in) which is essential when the truck is being used by the US Marines during amphibious operations, a front-mounted winch, an A-frame, special equipment for operations in cold weather, an anti-aircraft machine-gun on ring mount above the cab, a fully-enclosed cab, hard-top in place of the normal soft-top, a slave starting device, and so on. The vehicle is used primarily for the carriage of cargo, but is also used to tow the 155-mm (6.1-in) M198 and M114 howitzers and to tow various missiles.

Variants of the M809 family include the **M813A1** which has drop sides and tailgate to facilitate the bulk loading of cargo with forklift trucks, the **M814** long-wheelbase cargo truck which is often used to carry containers with surveillance radars, the **M815** bolster truck, the **M816** recovery vehicle (or wrecker as the Americans prefer to call it), the **M817** dump truck which can be fitted with bows and a tarpaulin cover to carry cargo, the **M818** tractor, the **M819** tractor/wrecker, the **M820** shop van, and the **M821** bridge transport; the type can also carry and launch components of the Ribbon Bridge.

Further development of the M809 family has resulted in the **M939** which is now in production for the US Army and US Marines.

Specification

M813

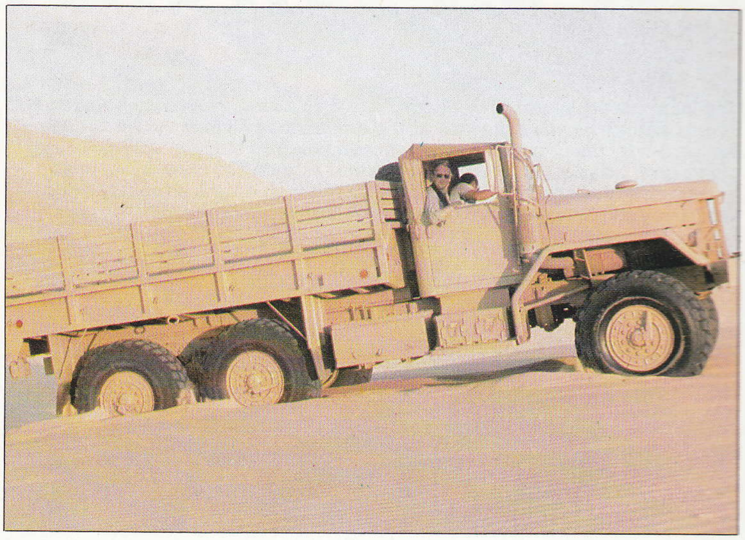
Crew: 1+2

Weights: empty 9750 kg (21,496 lb); loaded (cross-country) 14294 kg (31,512 lb)

Powerplant: one NHC-250 6-cylinder diesel developing 179.0 kW (240 hp)

Dimensions: length 7.645 m (25 ft 1 in); width 2.464 m (8 ft 1 in); height (overall) 2.946 m (9 ft 8 in)

Performance: maximum road speed 85 km/h (53 mph); maximum range 563 km (350 miles); gradient 67 per cent; side slope 42 per cent; fording 0.76 m (2 ft 6 in)

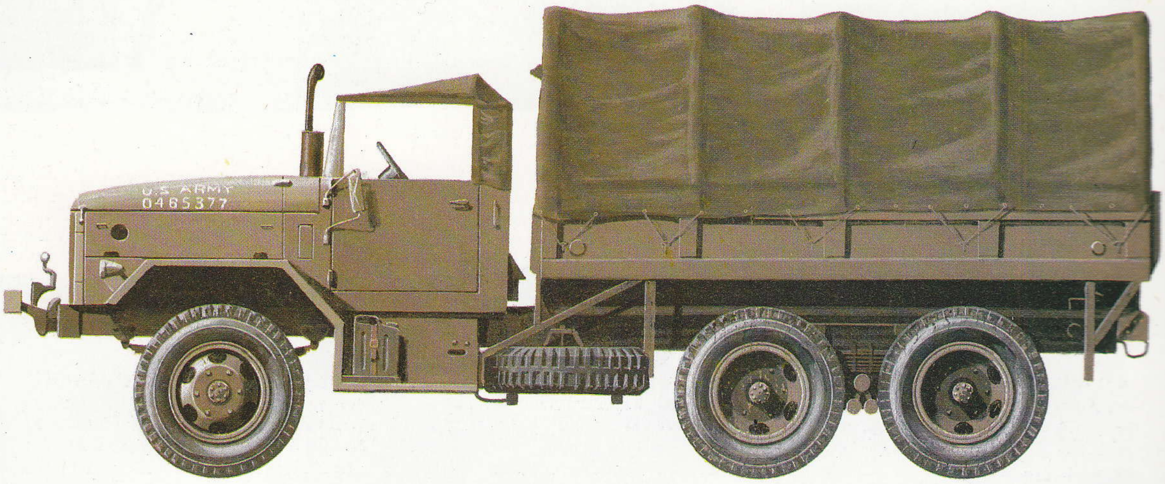


This American AM General M809 5-ton 6×6 cargo truck is fitted with an Enhanced Mobility System that allows the truck driver to adjust the tyre pressure to suit the type of ground being crossed.

USA

M35 2.5-ton 6×6 truck

The M35A2 is the most common model of this extensive range of 2.5-ton 6×6 trucks used by the US Army and countless other armies in every corner of the world. Current models have a much more fuel-efficient engine than the original petrol-engined vehicles of the 1950s.



During World War II the 2.5-ton 6×6 truck was the workhorse of the Allies, but after the end of the war plans were drawn up for its replacement. General Motors built the **M135** 2.5-ton truck with single wheels and the **M211** with dual rear wheels, while Reo built the **M34** with single rear wheels and the **M35** with dual rear wheels. It was intended that the Reo vehicle would be the standard vehicle in its class in the US Army, and the M34/M35 series was standardized and commonly known as the **Eager Beaver**. First producion vehicles were powered by a petrol engine, but the **M35A1** had a multi-fuel engine and the **M35A2** a multi-fuel diesel. In the late 1960s the M35 family, as well as other trucks, were manufactured by the Defense and Government Products Division of Kaiser Jeep, but in 1970 this company was taken over by American Motors and today is known as the AM General Corporation. The M35 series is the most widely used range of military trucks in the West, the US Army alone having over 65,000 vehicles of this type. The current production model is the M35A2 as the M34 with single rear wheels is no longer produced, although it does remain in service with a number of countries.

The layout of the M35 is identical with that of the 2.5-ton truck produced in World War II: the engine is at the front, the cab in the centre with a removable top and forward-folding windscreen, and the cargo area at the rear. The last has a stake-type body with a drop tailgate, removable bows and a tarpaulin cover. Along each side of the cargo body are folding troop seats. The engine is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case.

As the truck has to be used in a variety of climates and to carry out different missions, a complete range of optional equipment is available. Typical are a winch with a capacity of 4536 kg (10,000 lb) which can be used to the front or rear of the vehicle, an A-frame mounted at the front for field repairs, a fully-enclosed cab, a kit to enable vehicle to ford to a depth of 1.98 m (6 ft 6 in), slave cables for emergency starting, centre troop seats, special heaters for the engine and cargo area, and so on. The basic cargo vehicle can carry 2268 kg (5,000 lb) of cargo across country or 4536 kg (10,000 lb) on roads.

There are many variants of the M35, including the **M36** long-wheelbase cargo truck, the **M48** tractor truck, the **M49** fuel tanker, the **M50** water tanker, the **M59** dumper, the **M60** and **M108** wrecker, the **M109** shop van, the **M185** repair van, the **M292** shop van with extending sides and the **M342** dump truck. The **M963** is a product-improved M35A2, but has not so far entered production. It is likely that the M35 family will be replaced by a new 4×4 forward-control vehicle which is currently designated the Medium Tactical Truck (MTT).

Specification

M35

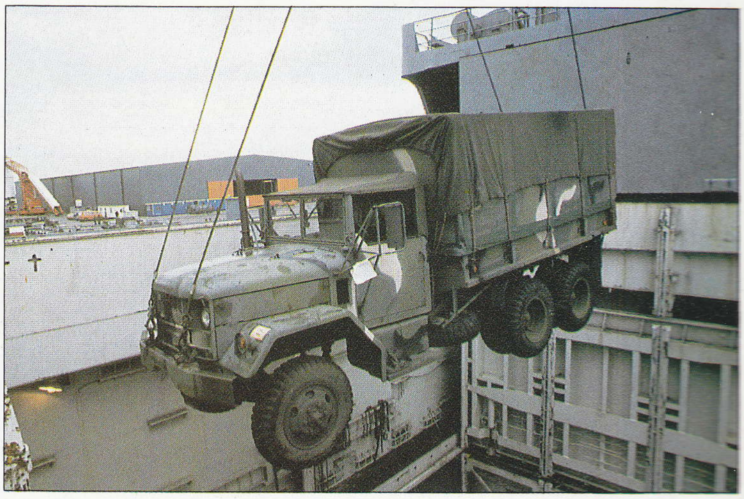
Crew: 1+2

Weights: empty 5900 kg (13,007 lb); loaded (cross-country) 8168 kg (18,007 lb)

Powerplant: one LDT-465-1C 6-cylinder multi-fuel diesel developing 104.4 kW (140 hp)

Dimensions: length 6.71 m (22 ft 0 in); width 2.39 m (7 ft 10 in); height (overall) 2.90 m (9 ft 6 in)

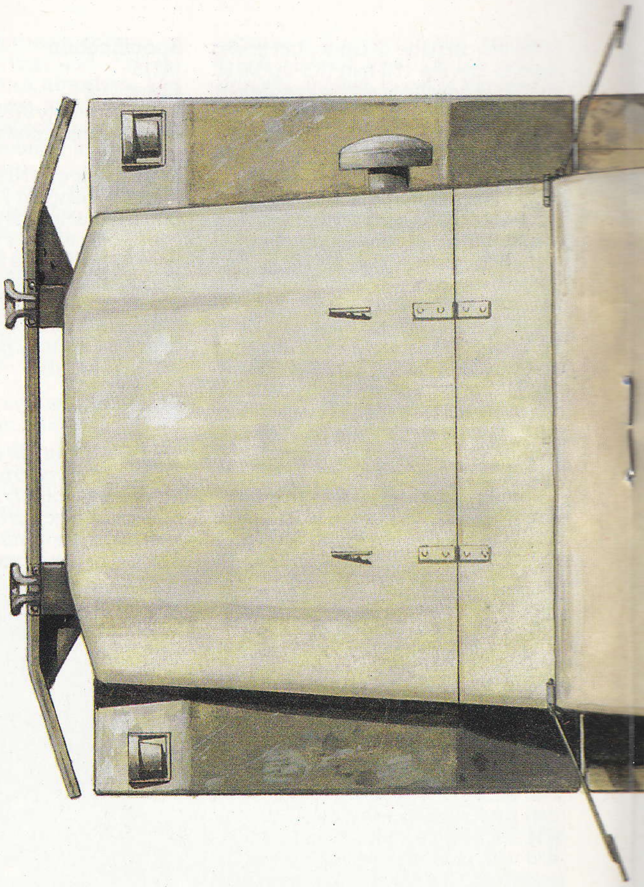
Performance: maximum road speed 90 km/h (56 mph); maximum range 483 km (300 miles); gradient 60 per cent; side slope 30 per cent; fording 0.76 m (2 ft 6 in)

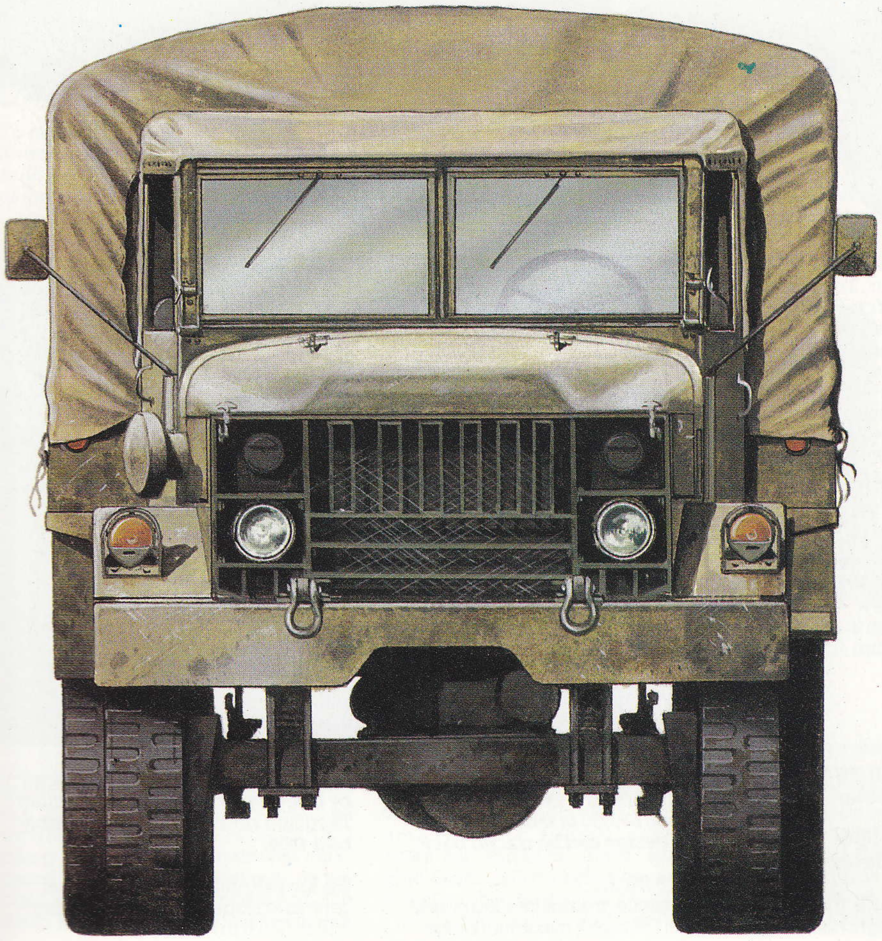


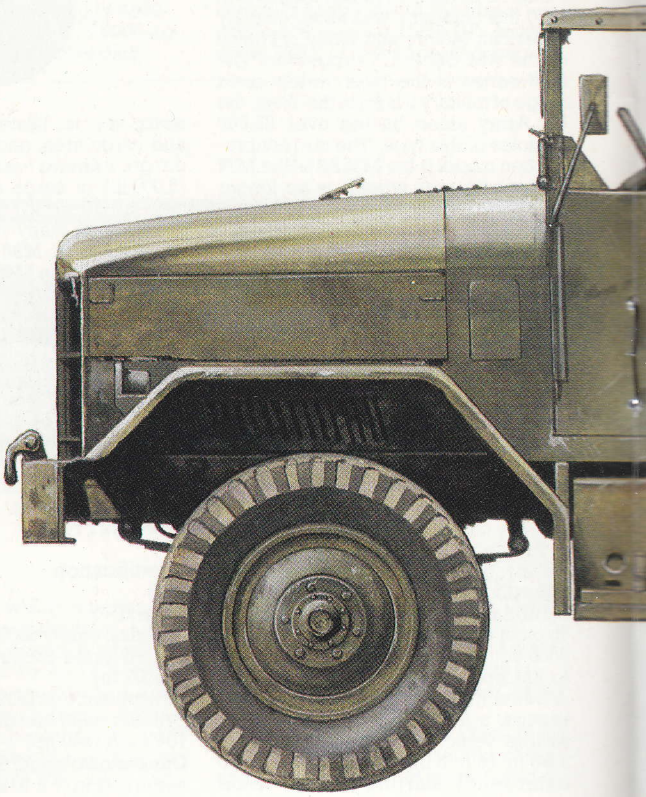
An M35 series 2.5-ton 6×6 truck is off-loaded from a ship. The US Army has some 65,000 of these trucks, whose design can be traced back around 35 years. It will be replaced by a new vehicle called the Medium Tactical Truck, which will probably be a 4×4.

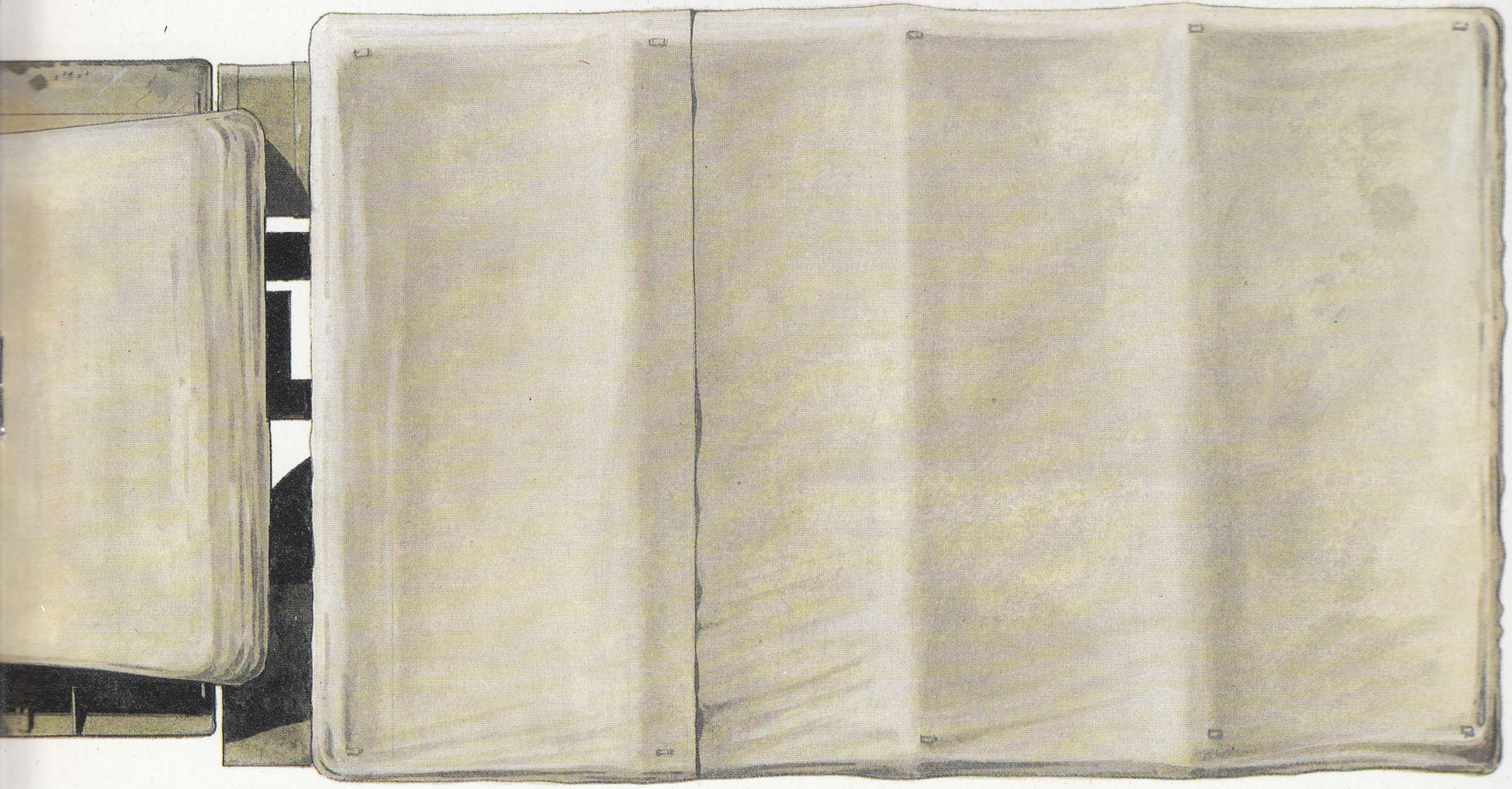
M35 2.5-ton 6x6 truck

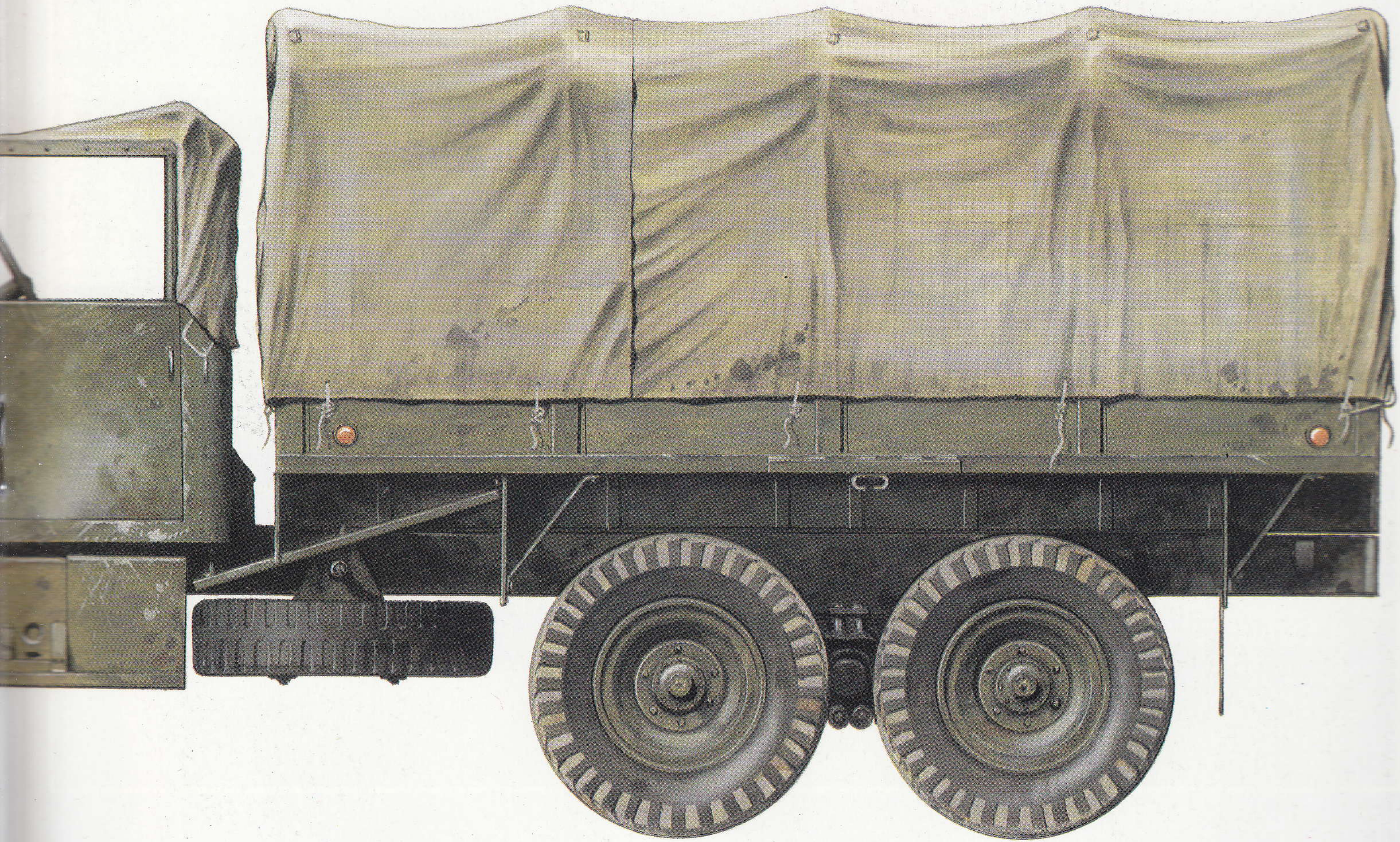
The basic cargo version of the M35A2 2.5-ton 6×6 truck is conventional in its layout, with removable canvas top and a windscreen which can be folded forward on to the bonnet. The cargo area has a drop tailgate and troop seats down each side; the M35A2c has drop sides as well. The chassis has been used for a wide number of specialist vehicles, including fuel tankers, water carriers, dump trucks, medical vans and recovery vehicles.











US Army 5-ton trucks

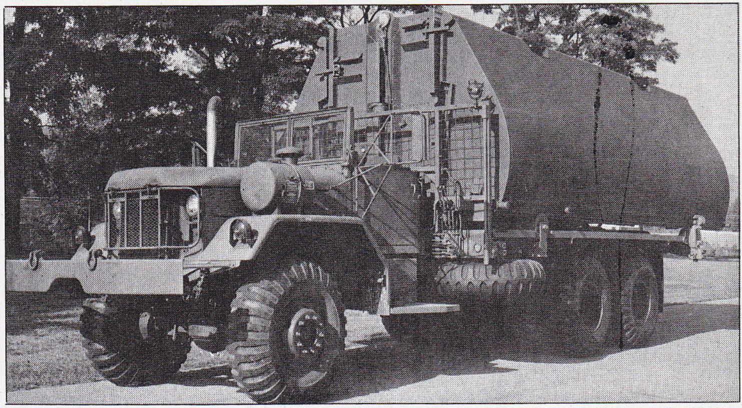
As mentioned separately, the M809 family of 5-ton 6×6 trucks was a further development of the M54 series that entered service with the US Army in the 1950s. Even when the M809 family entered service in 1970 it was known that further improvements were required in the key areas of transmission, transfer case and brakes, but with the ending of war in South East Asia the whole programme was shelved. In the mid-1970s this got under way again and the improved vehicle was eventully standardized as the M939 series. After the US Army had received competitive bids from a number of leading American truck manufacturers, AM General was awarded the production contract in 1981. The contract was valued at $628 million and covered the supply of 11,394 of the vehicles with a 100 per cent option. This is a large number of trucks, but the figure must be regarded in the context of a US Army overall requirement for almost 60,000 5-ton trucks and that in 1981 the US Army had just under 34,000 such vehicles on strength, of which almost 2,000 were over 15 years old. The first production M939 series vehicles were completed at AM General's plant at South Bend, Indiana, in 1982. The older M809 series is still in production for the export market as the M939 has yet to be released for foreign buyers.

The M939 family has a number of improvements over the earlier vehicles, including a fully automatic transmission in place of the standard manual box, a new two-speed transfer case, air brakes all round with a longer life than the earlier air/hydraulic brakes, the exhaust pipe relocated to the rear of the cab to meet the stringent requirements laid down by the Surgeon General to reduce noise levels for the crew, replacement of the mechanically-operated front-mounted winch by a hydraulic unit, and a three-man instead of two-man cab. To enable the crew to work on the engine more easily the bonnet and front bumper tilt forward. The M939 is the first truck in the US Army to be fitted with the new STE/ICE diagnostic equipment, which is also installed in the M1 Abrams MBT and the M2 Bradley IFV. This plug-in system allows the crew to locate faults quickly before the vehicle becomes seriously damaged.

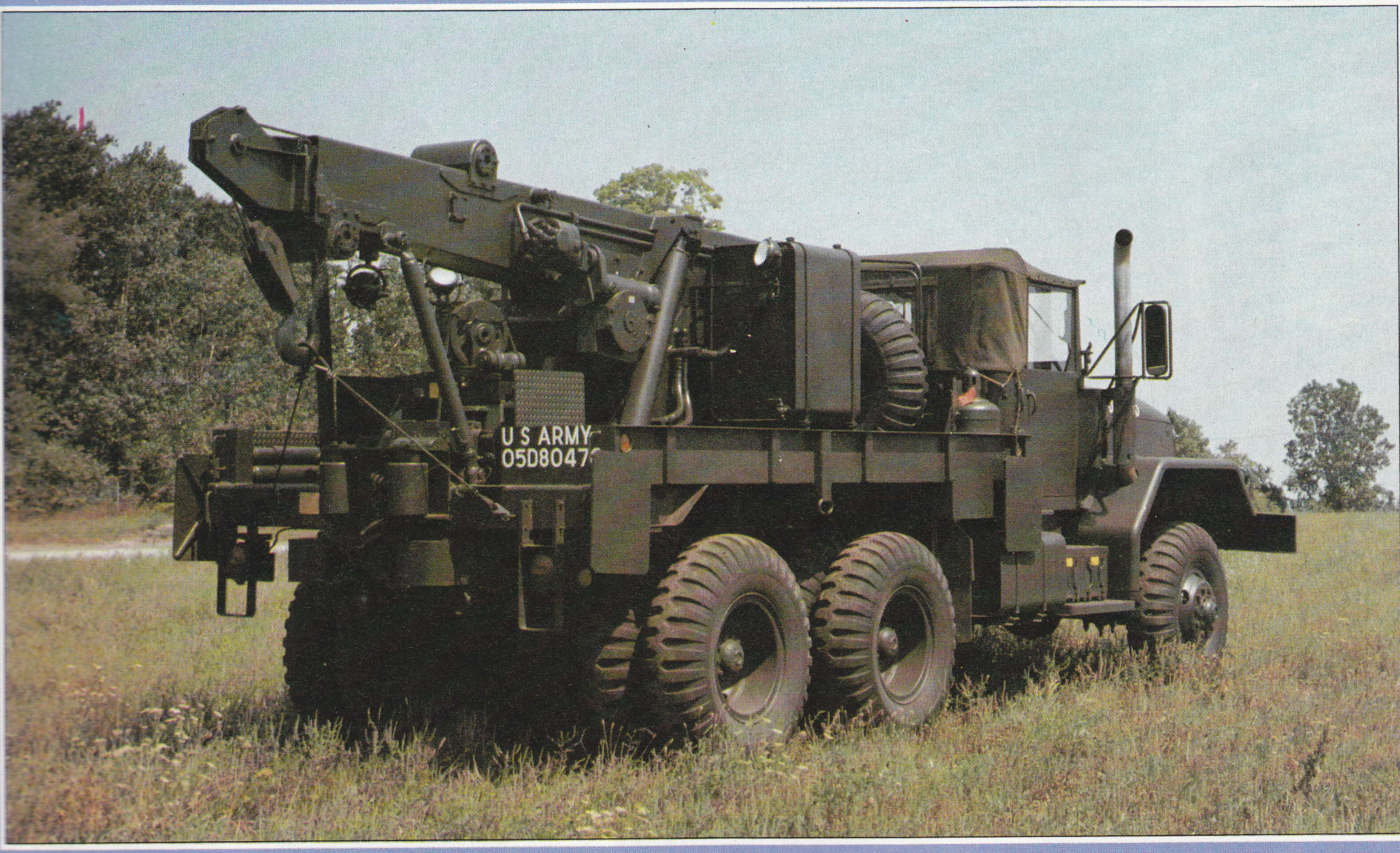
As usual there is a complete family of vehicles based on the same M939 chassis. The M923 is a cargo truck with drop sides, while the M924 is the standard cargo truck with drop tailgate and is the equivalent of the old M814. The M925 is the dropside cargo truck with winch, while the M926 is the basic cargo truck with winch. The M927 is the long-wheelbase cargo truck, and when fitted with a front-mounted winch this is known as the M928. The dump truck is the M929, and when fitted with a winch this becomes the M930. The tractor truck M931 is used to tow semi-trailers carrying vehicles and engineer equipment, and when fitted with a winch the model is called the M932. The M933 is the tractor/wrecker with winch, while the M934 has an expanding body, the version with a winch being the M935. The M934 and M935 are used for a wide range of roles such as workshops and command posts, and when static their sides are pulled out to increase their internal work space. The M936 is the wrecker and is fitted with a hydraulically-operated crane at the rear with a telescopic jib. This version is used to change engines and powerpacks in the field as well as to recover damaged and disabled vehicles; when the crane is being used stabilizers are lowered to steady the entire unit.

In addition to carrying cargo, the basic vehicle is also used to tow the 155-mm (6.1-in) M198 howitzer, and radars such as the AN/TPQ-36 mortar-locating set. Others have their dropsides and tailgates removed to carry specialized containers for use in the command role as well as to carry radars and other sensors. The vehicles are also used to move pallets of supplies, pods of fuel and equipment to enable tanks and other vehicles to be refuelled in forward areas.

As a private venture AM General Corporation has designed the Enhanced Mobility System for both the M809 and M939 series of trucks. This is a central tyre pressure-regulation system operated by the driver and allowing him to change the tyre pressure to suit the ground being crossed: for example, for movement on roads the tyres would be at maximum pressure, while for travel on sand they would be deflated to give the tyre more contact area with the ground and therefore greater mobility.



This version of the M809 series of 5-ton 6×6 trucks is used to carry and launch the Ribbon Bridge. This vehicle is carrying a standard folded-bay unit. In action, the truck would back into the water, where the unit slides off the rear and automatically unfolds.



The recovery member of the M809 family of 5-ton 6×6 tactical trucks is the M816. On the rear is a turntable fitted with a hydraulic crane with an extendable jib. When heavy vehicles are being lifted two stabilizers are lowered on each side for additional stability.

AUSTRALIA

International 5000-kg 6×6 truck

After the end of World War II the Australian Army had sufficient vehicles on hand to meet its immediate requirements. Then in the 1950s International Harvester of Australia and the Army Design Department collaborated on two new vehicles which would meet most of the army's heavier requirements. These were the **International 2500-kg** (5,512-lb) 4×4 and the **International 5000-kg** (11,023-lb) 6×6 vehicles which shared a number of common components such as cabs. Production of the 6×6 model started in 1966 and continued until 1974, by which time just over 1,400 had been completed.

The basic cargo truck is designated the **Truck, Cargo, 5-ton, General Service, F1**, while the dump truck model is called the **Truck, Dump, 5 cubic yard, General Service, F2**. In both models the engine is mounted under the forward control cab and is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. The front suspension consists of semi-elliptical springs with double-acting hydraulic shock absorbers, while the rear suspension consists of a multi-leaf six-rod tandem. Steering is of the semi-reversible cam and twin-lever type on the front axle, the tyres being 12.00×20 all round. The main brakes are two-circuit hydraulic, with one circuit for the second axle and one for the first and third axles. The mechanical parking brake acts on the rear wheels.

The rear cargo area is of steel construction with removable drop sides, tailgate, bench seats, bows and tarpaulin cover. The vehicle can carry a maximum payload of 4536 kg (10,000 lb) cross-country or 6804 kg (15,000 lb) on roads. Mounted to the rear of the cab is a winch which can be used to the front or rear of the vehicle; if this winch is overloaded the engine automatically stops to prevent damage. More recently some models have been fitted with an Abbey hydraulic crane to the rear of the cab to facilitate the loading and unloading of supplies. Before this hydraulic crane is used stabilizers are lowered to the ground on each side of the cab.

As usual there are a number of variants of the International truck to meet the requirements of other arms. The dump truck model has a hydraulically-operated rear tipping body with an air-controlled latch mechanism. For the troop-carrying role bench seats can be quickly fitted down each side and bows and a tarpaulin cover fitted over the top. The recovery model is called the **Truck, Wrecker, Medium, 5-ton, General Service, (5)** and is fitted with twin booms, winches and other recovery equipment. There are also water tankers, a bitumen spreader, a stores/box body version, a firefighting vehicle and an earth auger.

To replace the International 4×4 and 6×6 vehicles the Australian Army had two extensive competitions which resulted in the selection of the Mercedes-Benz 4×4 U 1700 L to meet the 4000-kg (8,818-lb) requirement and a Mack 6×6 truck to meet the 8000-kg (17,637-lb) requirement. Variants of the latter will include cargo, dump truck, water tanker, fuel tanker, tractor for the 155-mm (6.1-in) M198 howitzer, recovery vehicle, cement mixer, bitumen spreader and ammunition-carrying vehicles.

Specification

International 5000-kg

Crew: 1+1

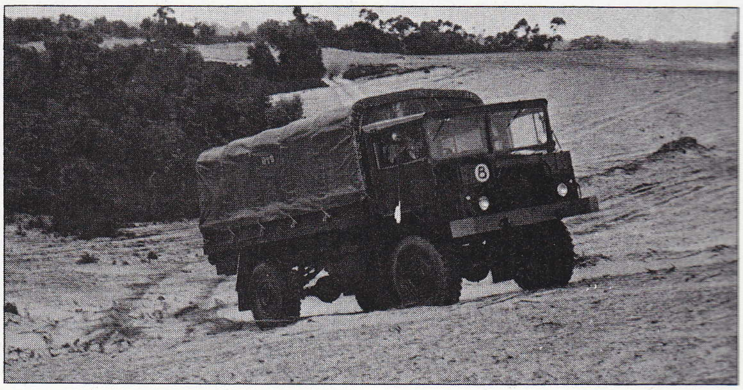
Weights: empty 6780 kg (14,947 lb); loaded (cross-country) 11316 kg (24,947 lb)

Powerplant: one International AGD-282 6-cylinder petrol engine developing 111.9 kW (150 hp)

Dimensions: length 6.909 m (22 ft 8 in); width 2.438 m (8 ft 0 in); height (cab) 2.616 m (8 ft 7 in)

Performance: maximum road speed 77 km/h (48 mph); maximum range 483 km (300 miles); gradient 60 per cent; side slope 30 per cent; fording 0.914 m (3 ft 0 in)

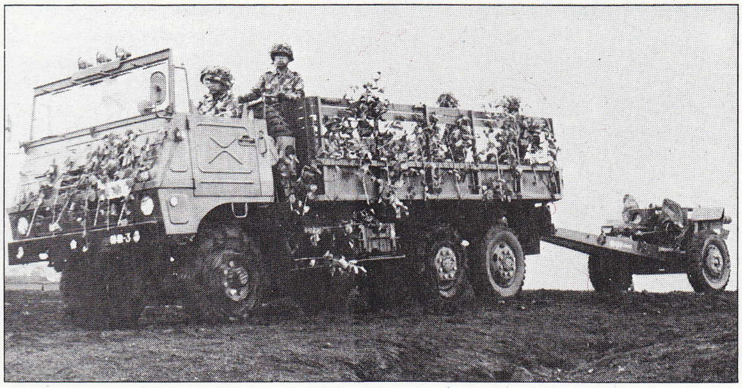
Australian infantry dismount from their International Harvester 2500-kg (5,515-lb) 4×4 trucks. Between 1959 and 1971 over 2,300 of these were built in Australia.



An Australian International Harvester 2500-kg (5,515-lb) 4×4 truck with bows and tarpaulin cover in place.

JAPAN

Isuzu Type 73 3500-kg 6×6 truck



A Type 73 3500-kg (7,716-lb) 6×6 truck of the Japanese Ground Self-Defence Force tows an old American 105-mm M101 howitzer. This vehicle was designed by Isuzu Motors as the replacement for the older Isuzu 6×6 truck, which had a cross country payload of 2500 kg (5,511 lb).

In the early 1950s the Isuzu Motor Company built a 6×6 truck almost identical in appearance to the American 2.5-ton 6×6 vehicle used during World War II, and this was subsequently placed in production to meet the requirements of the US forces stationed in Japan and of the Japanese Ground Self-Defence Force. The original model was the **TW**, later models being designated **TWD 20** and **TWD 25**; all of these could carry 2500 kg (5,512 lb) of cargo across country or 5000 kg (11,023 lb) of cargo on roads, and were built with single or dual rear wheels. In addition to the basic cargo model there are many specialized versions including a dump truck which can also be used to carry cargo, an air compressor, water and fuel tankers, recovery vehicles, shop vans for many applications, and a long-wheelbase cargo truck.

These Isuzu 2500-kg (5,512-lb) 6×6 trucks are now being replaced by the **Isuzu Type 73** truck, which can carry 3500 kg (7,716 lb) across country or 6000 kg (13,228 lb) on roads. The type is also used for towing a wide range of weapons, such as 105-mm (4.13-in) howitzers and twin 35-mm anti-aircraft cannon. The Type 73 has a forward control cab with a soft top, and the cargo area at the rear is provided with a drop tailgate, removable bows and a tarpaulin cover. The engine is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. Suspension front and rear consists of semi-elliptical springs and hydraulic shock absorbers. Tyres are 9.00×20 all round, the rear axles having single tyres.

Variants of the Type 73 truck include a shop van with a fully-enclosed rear body, light wrecker with turntable-mounted crane at the rear, fuel tanker, water tanker, cargo truck with hydraulic crane mounted to the rear of the cab for unloading purposes, fire-control vehicle, and a dump truck. There is also a carrier for the Tan-SAM surface-to-air missile system: one vehicle carries four missiles in the ready-to-launch position, while another acts as the fire-control centre. Both of these versions are fitted with hydraulically-operated stabilizers that are lowered to the ground before the system becomes operational.

As previously mentioned, the 2500-kg (5,512-lb) trucks are now being replaced by the 3500-kg (7,716-lb) vehicles. The other standard truck of the Japanese Ground Self-Defence Force is the old **Hino 6×6 series**, which can carry 4000 kg (8,818 lb) of cargo across country or double this amount on roads. These vehicles are of conventional appearance, with the engine at front, the soft-top cab in the centre and the cargo area at the rear. As usual there are many variants, including the **Type 67 Model 30** rocket-launcher and its associated rocket resupply vehicle.

Specification

Type 73

Crew: 1+1

Weights: empty 6640 kg (14,639 lb); loaded (cross-country) 10140 kg (22,355 lb)

Powerplant: one Model 8PA V-8 diesel developing 130.5 kW (175 hp)

Dimensions: length 6.67 m (21 ft 10.6 in); width 2.41 m (7 ft 10.9 in); height (overall) 3.02 m (9 ft 10.9 in)

Performance: maximum road speed 90 km/h (56 mph); maximum range 500 km (311 miles); gradient 60 per cent; side slope 30 per cent; fording 0.8 m (2 ft 7.5 in)

POLAND

Star 266 3500-kg 6×6 truck

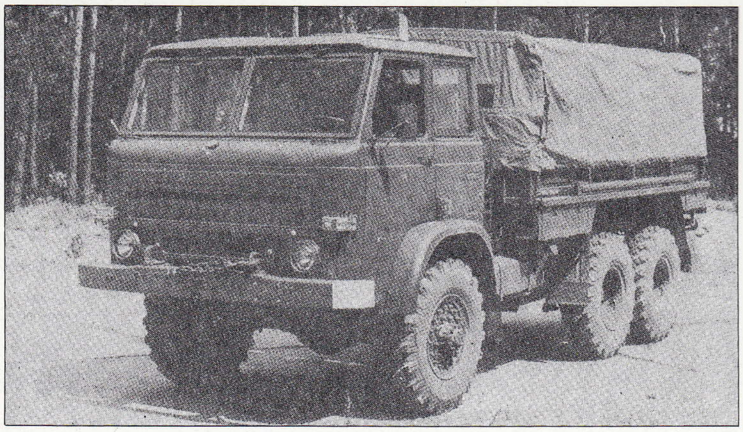
It is often thought that non-Soviet members of the Warsaw Pact rely on the Soviet Union to supply all of their ground forces' equipment, but in the case of infantry weapons and trucks this is far from the truth. For many years the Starzchowice Motor Vehicle Plant in Poland has been supplying large numbers of 6×6 trucks, not only to the Polish armed forces but also for the export market. From 1960 the **Star 66** 6×6 became the standard vehicle in its class in the Polish army, and could carry 2500 kg (5,512 lb) of cargo across country or 4000 kg (8,818 lb) of cargo on roads. In the 1960s the **Star 660 M1** and later the **Star 660 M2** appeared with minor improvements. All of these were powered by a petrol engine, but the **Star 660D** was powered by a diesel engine more efficient than the earlier petrol engines.

In 1971 the Starzchowice Motor Vehicle Plant built the prototype of the **Star 266** 6×6 truck which entered production in 1976. This was a major improvement over the earlier vehicles as it can carry 3500 kg (7,716 lb) of cargo across country or 5000 kg (11,023 lb) on roads, the maximum towed load being 4000 kg (8,818 lb).

The diesel engine is mounted under the all-steel fully-enclosed cab and is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. The main brakes are hydraulic, the parking brake being mechanical and acting on the rear wheels. Tyres are 12.00×20 all round, and a central tyre pressure-regulation system is fitted as standard on all vehicles. The cab is provided with a heater, a winch with a capacity of 6000 kg (13,228 lb) is fitted, and the rear cargo area has a drop tailgate, removable bows and a tarpaulin cover.

As there were many variants of the earlier Star 66, Star 660 M1 and Star 660 M2 series of trucks, including tankers, cranes, repair vehicles and decontamination vehicles (plus box bodies for repair, command and communications adaptations), it can be expected that there are or will be similar models of the Star 266.

In Hungary it is Csepel which produces trucks for the Hungarian army, the **Csepel D-566** 5000-kg (11,023-lb) 6×6 truck being the most common. This has a fully-enclosed forward control cab and, at the rear, the cargo area which is provided with drop tailgate, removable bows and a tarpaulin cover. The D-566 is powered by a Raba-MAN six-cylinder diesel developing 200 hp (149.1 kW) and coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. Standard equipment includes a central tyre pressure-regulation system and a winch. Known variants of this vehicle include a shop van with a fully-enclosed rear body, and a recovery vehicle.



For many years the Star 66 2500-kg (5,511-lb) truck was the standard vehicle in its class in the Polish army. Later production models had a fully-enclosed cab, increased fording capability and finally a diesel engine for greater fuel economy.

Specification

Star 266

crew: 1+2

Weights: empty 7200 kg (15,873 lb); loaded (cross-country) 10700 kg (23,589 lb)

Powerplant: one S-359 6-cylinder diesel developing 111.9 kW (150 hp)

Dimensions: length 6.80 m (22 ft 3.7 in); width 2.50 m (8 ft 2.4 in); height (cab) 2.64 m (8 ft 7.9 in)

Performance: maximum road speed 86 km/h (53 mph); maximum range 800/1000 km (497/621 miles); gradient 76 per cent; side slope 30 per cent; fording 1.8 m (5 ft 10.9 in)

USSR

Ural-375D 4000-kg 6×6 truck

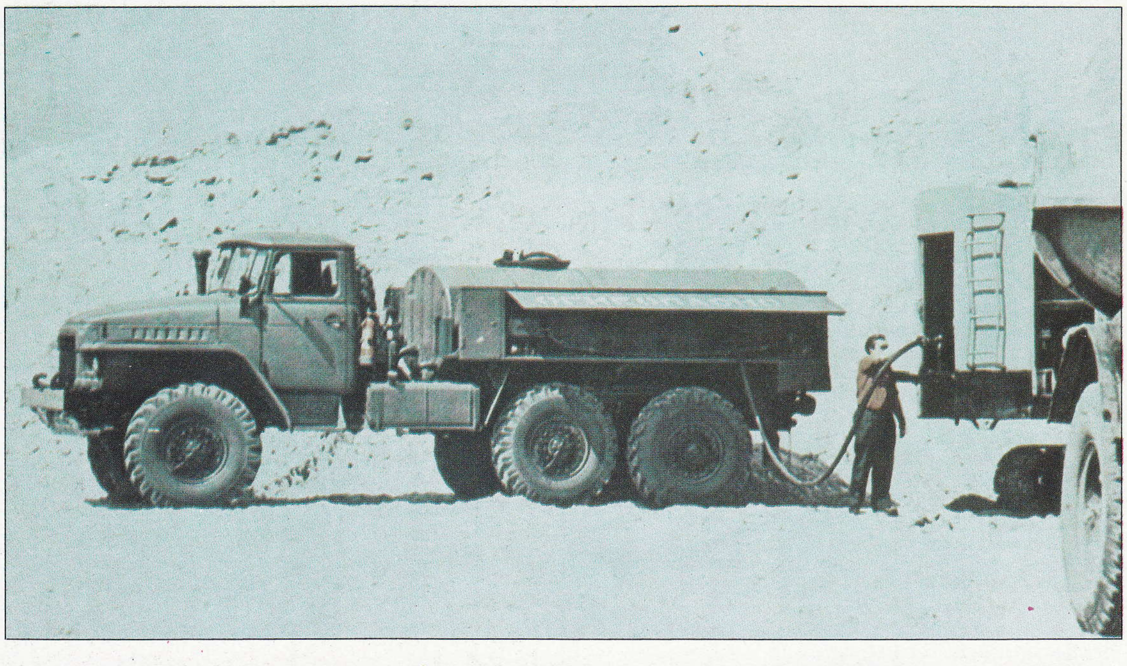
In 1961 the Ural Motor Vehicle Plant started the manufacture of the **Ural-375** 6×6 truck, which had an open cab roof (that could be covered by a canvas top) and a stake-type rear cargo body with a drop tailgate. This was followed by the **Ural-375A** which had an all-steel fully-enclosed cab and a number of automotive improvements. Produced in the largest numbers, however, was the **Ural-375D** which can carry 4000 kg (8,818 lb) of cargo across country and 4500 kg (9,921 lb) on roads, the maximum towed loads being 5000 kg (11,023 lb) and 10000 kg (22,046 lb) respectively. The vehicle uses many automotive components of the **Ural-377** 6×4 series of truck that includes the **Ural-377M** with a central tyre pressure-regulation system for use by the Soviet army and the **Ural-377S** tractor truck for towing semi-trailers. These vehicles are used by the Soviet army where all-wheel drive is not considered essential as they are more fuel efficient on roads than the all-wheel drive trucks.

The all-steel fully-enclosed three-man cab has a heater, and the rear cargo area is provided with a drop tailgate, bows and a tarpaulin cover. As with the ZIL-131 truck, hinged seats are provided down each side of the cargo area to enable troops to be carried. The engine is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. As with most Soviet trucks, the engine is fitted with a pre-heater so that it can be started in very low temperatures. Tyres are 14.00×20 all round, with a central tyre pressure-regulation system fitted as standard.

As usual there are a host of specialized versions for civil and military applications, these variants including the **Ural-375N** with drop sides which enables rapid loading and unloading with the aid of forklift trucks, special models for operating in very cold climates or the tropics, tank and fuel resupply vehicles, and a recovery truck; the type can also be fitted with the usual fully-enclosed boxed body which is used for every conceivable role from command centre to field workshop, and can also be used for carrying pontoons and multiple rocket-launchers such as the 122-mm (4.8-in) BM-21 40-round system.

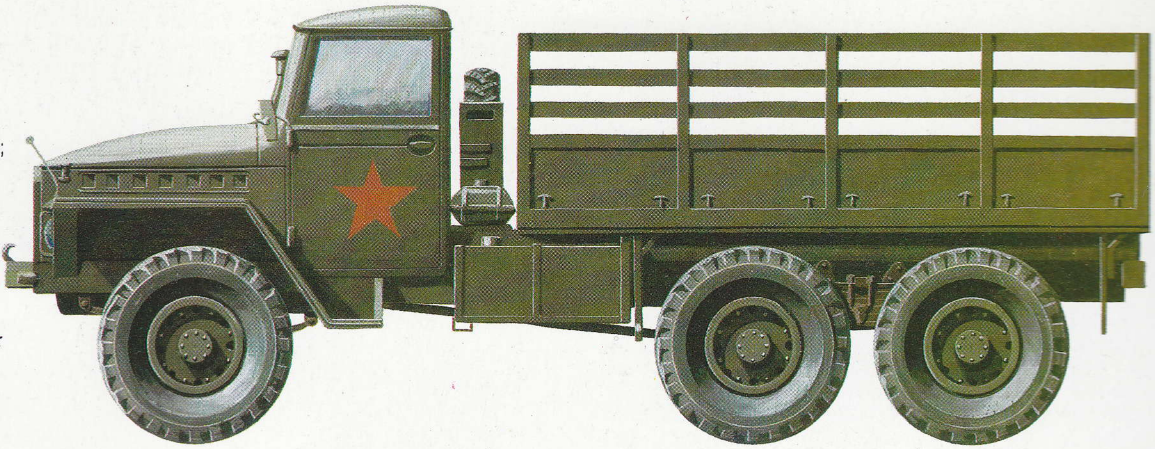
The most interesting version is the **TMS-65** decontamination vehicle, which is the basic vehicle with its cargo body replaced by a modified jet engine (at the very rear) and tanks for the jet fuel and decontamination liquid (to the cab rear). When in position armoured vehicles are driven slowly past the TMS-65 which decontaminates the vehicle. The TMS-65 also tows a trailer with 4000 litres (880 Imp gal) of decontamination solution.

The latest member of the family to enter production is the **Ural-4320** 6×6 4500-kg (9,921-lb) truck, which has a more powerful V-8 diesel that not only gives a higher speed but also greater range of action and increased payload. Variants of the Ural-4320, which is in service with the Soviet army, include the **Ural-4420** 6×6 tractor truck, **Ural-43202** truck with central tyre pressure-regulation system, and the **Ural-44202** tractor truck which also has a central tyre pressure-regulation system.



Among the many versions of the Sovet Ural-375D 4000-kg (8,818-lb) truck are various tankers, some of which are fitted with up to four reels and hoses to enable them to refuel trucks and armoured fighting vehicles in the forward battlefield area.

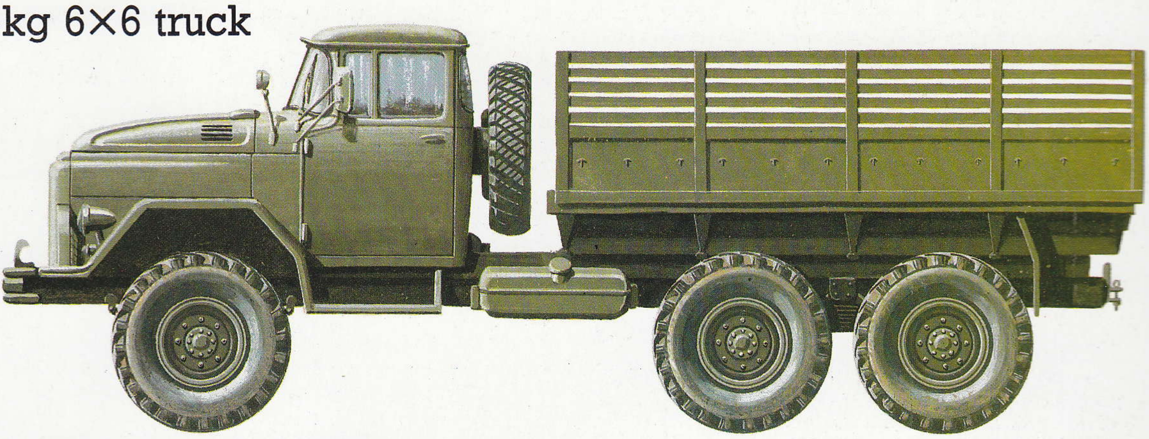
Specification
Ural-375D
Crew: 1+2
Weights: empty 8400 kg (18,519 lb); loaded 12400 kg (27,337 lb)
Powerplant: one ZIL-375 V-8 petrol engine developing 134.2 kW (180 hp)
Dimensions: length 7.35 m (24 ft 1.4 in); width 2.69 m (8 ft 9.9 in); height 2.68 m (8 ft 9.5 in)
Performance: maximum road speed 75 km/h (47 mph); maximum range 650 km (404 miles); gradient 60 per cent; side slope 30 per cent; fording 1.0 m (3 ft 3.4 in)



A Ural-375D 4000-kg (8,818-lb) truck with bows and tarpaulin cover removed. Cargo is loaded via drop down rear tailgate. Vehicles fitted with a 7000-kg (15,432-lb) winch are called the Ural-375T.

USSR

ZIL-131 3500-kg 6×6 truck



The ZIL-131 3500-kg (7,716-lb) cargo truck was the replacement for the ZIL-157 vehicle. It is widely used as a prime mover for 122-mm guns and for mounting multiple rocket launchers such as the 122-mm BM-21.

Late in 1966 the **ZIL-131** 3500-kg (7,716-lb) 6×6 truck entered production at the Likhachev Motor Vehicle Plant in Moscow as the replacement for the older **ZIL-157** 2500-kg (5,512-lb) 6×6 truck which had been developed in the late 1950s and was in turn based on the **ZIL-151** 6×6 truck which had been produced from 1947 to 1958. The ZIL-131 is used for a wide range of roles by the Soviet armed forces and by the many other countries that receive Soviet aid. The type shares many components with the **ZIL-133** 6×4 truck, which is used for both civil and military applications.

The ZIL-131 can carry 5000 kg (11,023 lb) of cargo on roads or 4000 kg (8,818 lb) across country, the maximum towed loads being 6500 kg (14,330 lb) and 4000 kg (8,818 lb) respectively. The engine is located at the front of the vehicle and is coupled to a manual gearbox with five forward and one reverse gear and a two-speed transfer case. The front suspension consists of semi-elliptical springs with hydraulic shock absorbers, while the rear suspension consists of an equalizer arm on longitudinal semi-elliptical springs. Tyres are 12.00×20 all round, with a central tyre pressure-regulation system fitted as standard. The all-steel fully-enclosed cab has a heater as standard. The rear cargo area consists of a wooden platform with drop tailgate, removable bows and a tarpaulin cover. To enable the vehicle to be converted quickly for use in the troop transport role, hinged bench seats are fitted down each side of the rear cargo area. All vehicles are fitted with a 4500-kg (9,921-lb) capacity winch.

The ZIL-131 is used for a wide range of roles in addition to its basic tasks of carrying cargo and towing artillery and other weapons. The **ZIL-131D** is a dump truck, while the **ZIL-131V** is used to tow semi-trailers. The **ARS-14** is a special decontamination vehicle which can be used to fight fires as well as to decontaminate vehicles, weapons and other equipment. The chassis is also used to mount a wide range of fully-enclosed box bodies for use in the command, communications, transport and repair roles, while there are also many tankers (fuel and water) and fuel service trucks to refuel vehicles in the forward areas. One of the more interesting versions is the **MA-41** tanker which carries diesel fuel, oil, water and petrol, the diesel and water tanks being provided with heaters so that vehicles can be resupplied even in the coldest weather. The chassis has also been used to mount the 140-mm (5.51-in) BM-14-16 and 122-mm (4.8-in) BM-21 multiple rocket-launchers.

Missile batteries have to be resupplied in the forward area, and to this end the ZIL-131 has been modified to carry the SA-6 'Gainful' and SA-3 'Goa' missiles. In the former case three missiles are carried with a foldable crane mounted at the rear of the truck to enable the vehicle to resupply the SA-6 'Gainful' launcher without external assistance. The SA-3 'Goa' resupply vehicle has two missiles, which are winched on to the SA-3 launcher.

Specification
ZIL-131
Crew: 1×2
Weights: empty 6700 kg (14,771 lb); loaded (cross-country) 10425 kg (22,983 lb)
Powerplant: one ZIL-131 V-8 petrol engine developing 111.9 kW (150 hp)
Dimensions: length 7.04 m (23 ft 1.2 in); width 2.50 m (8 ft 2.4 in); height (cab) 2.48 m (8 ft 1.6 in)
Performance: maximum road speed 80 km/h (50 mph); maximum range 525 km (326 miles); gradient 60 per cent; side slope 30 per cent; fording 1.4 m (4 ft 7.1 in)

A ZIL-131 3500-kg (7,716-lb) 6×6 cargo truck shows cross-country mobility. All vehicles have a central tyre pressure system, a winch with a capacity of 4500 kg (9,921 lb), a fully-enclosed cab with heater, and an engine heater.

Wheels of War

The ferocious intensity of modern armoured warfare cannot be maintained for more than a few days without vast quantities of fresh supplies. More than ever before, the logistics system is the lifeblood of an army.

After years of neglect the US Army is at last engaged in a major programme to replace many of its tactical vehicles that are over 20 years old. Shown here are M35 2.5-ton 6×6 and M809 5-ton 6×6 trucks.

In any future conflict in Europe, logistics will play an important if not deciding part. Events in Middle Eastern conflicts have shown that the side which can keep its forward units best supplied with ammunition, fuel, food and other essential supplies has a decided advantage over its opponent. While the Warsaw Pact armies have a high degree of standardization in their tactical vehicles, there is little if any standardization within NATO. This is mainly because all of the major NATO countries (including the UK, USA, Netherlands, France, West Germany, Italy and Spain) have large automotive industries that can provide virtually all of the home user's requirements. In many cases these companies export military and civilian trucks on a wide scale and some of them (for example Renault of France and Pegaso of Spain) also build wheeled armoured vehicles. Within this short space it is impossible to cover every member of NATO, so only West Germany, the UK and the USA are discussed here.

West Germany

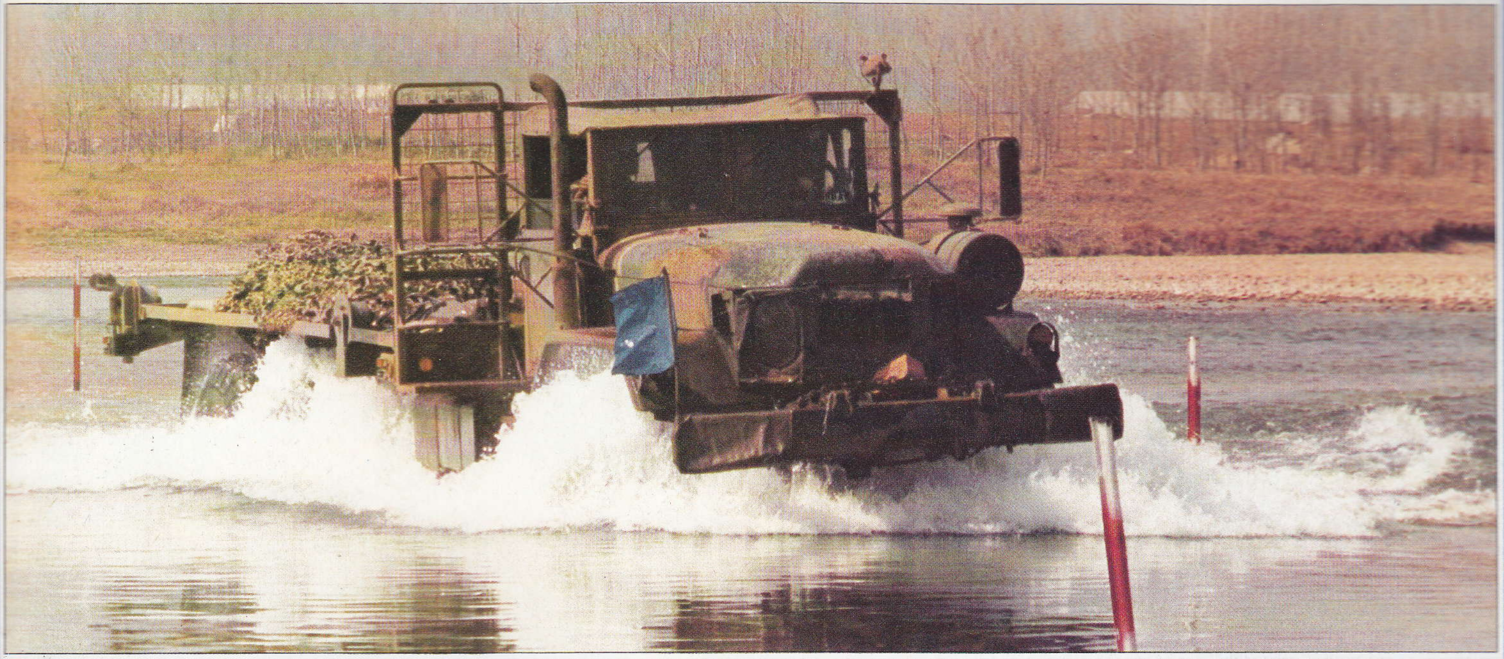
In the last few years the West German army has been re-equipped almost completely with new tactical transport vehicles, all of which have been supplied by companies of the West German automotive industry including MAN, Mercedes-Benz and Magirus Deutz. The so-called second generation includes the vehicles in Categories I, II, III and IV. A total of 8,385 Category I vehicles was built by MAN between 1976 and 1981 in 4×4, 6×6 and 8×8 configurations. These vehicles have very high cross-country mobility and have been designed to keep up with forward units. Wherever possible they use standard automotive components and many are fitted with winches for self-recovery and with hydraulic cranes for loading and unloading stores. A few of the MAN 8×8 trucks have been supplied to the Canadian Armed Forces, and in 1984 one of these undertook a cross-country race with a Leopard 1 MBT tank, the truck winning the race! The Category III vehicles are of 4×4 and 6×6 configurations, while the Category IV vehicles, which are used in the rear areas, are 4×2 and 6×4 configuration as it is not expected that they will have to cross rough country.

United Kingdom

This country has almost completed its modernization programme for its B (soft skinned) vehicle fleet. There are three main types in the British Army fleet: high mobility, medium mobility and low mobility. The only high-mobility vehicle in the fleet is the Alvis Stalwart 6×6 amphibian truck, which uses many automotive components of the Saracen APC and Saladin armoured car built from 1966 to 1971. At present there are no plans to replace this essential vehicle, which is used in forward areas to carry refuelling pods and to bring up ammunition to tank and artillery units. The medium-mobility vehicles include the Bedford 4-tonne and 8-tonne 4×4 trucks and the Foden 6×6 vehicles used with the 155-mm (6.1-in) FH-70 howitzer. All of these are standard commercial vehicles modified with all-wheel drive, military type bodies and other small changes to suit them for military use. In the future it is expected that there will be introduced a 14-tonne truck which will share many common components with the Bedford 8-tonne TM 4-4, of which over 2,000 have been ordered by the British army. Low-mobility vehicles include 4×2 Bedfords and 6×4 and 8×4 Fodens, with some 1,300 Fodens already in service. At present the low-mobility vehicles take the ammunition and other supplies from rear area depots up towards the FLOT (Forward Line Of Troops), where loads are then transferred to medium-mobility vehicles to be taken as far forward as possible. If the stores are on pallets then they can be quickly reloaded onto the other vehicles; if they are not the transfer is a time-consuming job.

Currently being tested by the British Army of the Rhine (BAOR) is a revolutionary system called DROPS (Demountable Rack Off-loading and Pick-up System). This consists essentially of a platform on the rear of a cross-country truck which can carry not only pallets of ammunition and other supplies, but also containers, box bodies, refuellers and so on. These can be quickly offloaded without any external assistance, leaving the truck to return to the rear for another load. This allows a smaller number of vehicles to carry out more work.

The British Army has fitted some of its Bedford MK 4000-kg (8,818-lb) 4×4 trucks with snow ploughs for use in Norway, where British units of the Allied Mobile Force (AMF) train every year.

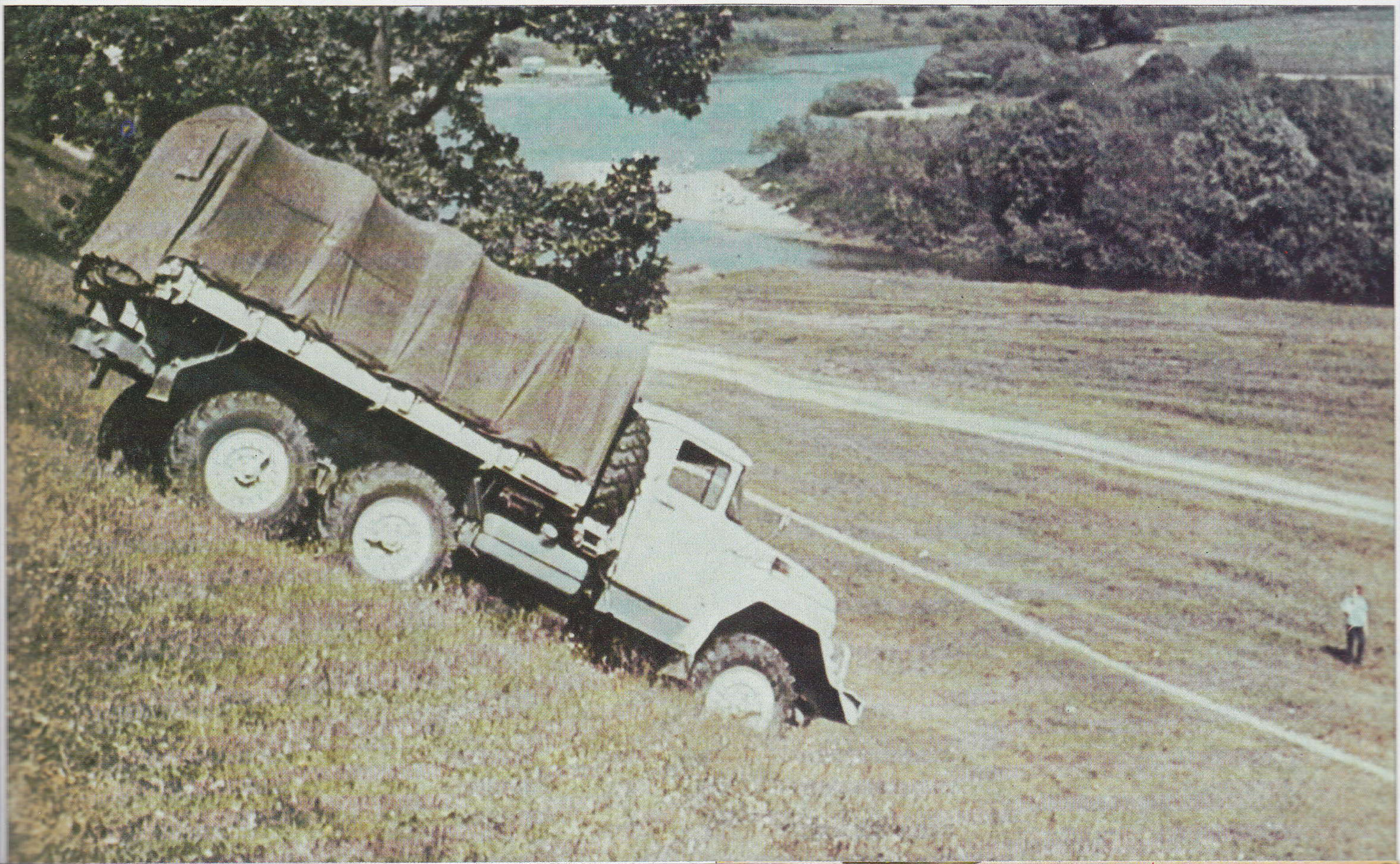


An M809 series 5-ton 6×6 truck of the US Army fords a river without its unit of the Ribbon Bridge. The Army has developed a pallet which enables these trucks to carry stores when not required to carry their Ribbon Bridge units.

United States

For many years logistics have been rather neglected by the US Army, but in recent years a start has at last been made in providing new vehicles. The 2.5-ton and 5-ton 6×6 trucks are still the backbone of the tactical transport fleet. The total requirement is some 160,000 vehicles, though the actual number is well under this figure. For many years the only vehicle with a good cross-country capability was the GOER 4×4 series, of which 1,300 were built between 1972 and 1976. Now entering service is the so-called Heavy Expanded Mobility Tactical Truck, an 8×8 vehicle built by Oshkosh. In addition to the basic cargo version, which can carry 9979 kg (22,000 lb), tanker, tractor truck and recovery variants are also being procured. The first order was for 2,140 vehicles against a total requirement of some 7,490. The first HEMTTs have already been deployed to Europe, where one of their first tasks is to support the Multiple Launch Rocket System (MLRS).

The US Army has realized that its armoured vehicles and artillery will have to be supplied as far forward as possible, for otherwise they will have to withdraw to the rear. With this in mind full-tracked armoured vehicles are now being developed which will be able to operate with the forward units. The first of these is the M992 Field Artillery Ammunition Support Vehicle (FAASV), which backs up to the rear of an M109 155-mm self-propelled howitzer and transfers new ammunition with the aid of a conveyor belt. Over 100 155-mm projectiles, charges and fuses can be carried by this vehicle.



A common feature of most all-wheel drive trucks in service with the Soviet army, such as this Ural-375D, is its tyre pressure regulation system, but in wartime the army would take over many civilian trucks with little cross-country mobility.

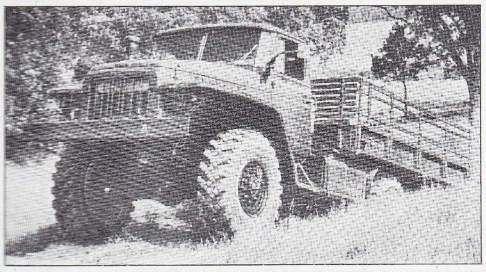
Warsaw Pact

Although some Warsaw Pact countries, for example Czechoslovakia, build their own tactical transport vehicles, most of them are supplied by the Soviet Union, this process ensuring a great deal of commonality together with its obvious cost, training and repair advantages. Almost all front-line vehicles used by the Soviet army have 6×6 drive and are fitted with a central tyre pressure-regulation system for improved cross-country mobility. In the event of war, however, the Soviet army fleet would be augmented by many civilian vehicles, some with all-wheel drive but many of 6×4 or 4×2 configuration. When the Soviet Union invaded Afghanistan at the end of 1979, many civilian vehicles were employed in carrying supplies from the Soviet Union through to Kabul in Afghanistan. In time of war in Europe, Allied tactical air forces would attack roads and railways, so forcing the trucks to travel across country, where they travel much more slowly and consume more fuel. So far the Warsaw Pact nations do not appear to have fitted many of their vehicles with small cranes so that they can unload themselves without any external assistance, and thus unloading ammunition and other essential supplies could well take a long time.

It should also be remembered that in the event of a Warsaw Pact invasion of western Europe, the Soviet supply line would get progressively longer while NATO's would get shorter. Some NATO countries are known to have only enough supplies of ammunition for a few days of hard fighting, and again events in the Middle East have shown that the amount of ammunition and missiles used in the first few days of combat have generally been far above those anticipated in peacetime exercises.

There are known instances of tank units running out of ammunition as the trucks carrying their ammunition not only lacked cross-country mobility, but were hit by enemy shell fire and destroyed because they had no armour protection.

Logistics can also be taken to include the repair and recovery of damaged and disabled vehicles on the battlefield. The object of the NATO forces is to repair the vehicles as far forward as possible so they can quickly return to the fight. NATO forces are equipped with excellent recovery vehicles based on MBT and other tracked vehicle chassis which are far superior to any armoured recovery vehicles used by the Warsaw Pact. For many years Warsaw Pact armoured recovery vehicles were based on obsolete tank chassis and limited to towing operations only. Almost all NATO ARVs are fitted not only with winches to recover disabled vehicles but also with cranes for changing engines and powerpacks.



A Soviet Ural-375D series 6×6 truck moves across country. In very general terms the Soviets have not put as much emphasis on keeping their forward elements supplied as have their Western counterparts.

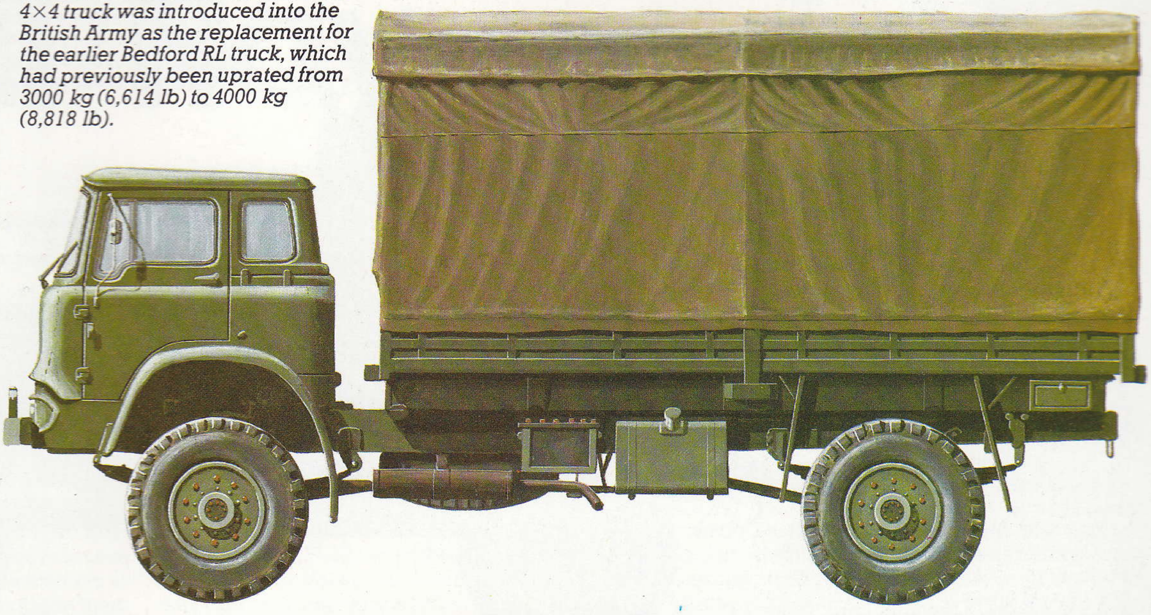
West German Army MAN high-mobility vehicles plough across rough terrain during durability trials. Of all NATO countries, West Germany has the most well-equipped and up-to-date range of trucks. The US Army uses MANs as part of the ground-launched cruise missile system.

A convoy of NATO trucks winds its way forwards. In time of war many roads would be damaged by Soviet aircraft or blocked by escaping civilians; it is therefore essential that as many NATO trucks as possible have good mobility across country.

UK

Bedford MK 4000-kg 4×4 truck

The Bedford MK 4000-kg (8,818-lb) 4×4 truck was introduced into the British Army as the replacement for the earlier Bedford RL truck, which had previously been uprated from 3000 kg (6,614 lb) to 4000 kg (8,818 lb).



In the early 1950s the British army selected the **Bedford RL** 4×4 vehicle as one of its standard 3000-kg (6,614-lb) trucks, although in 1968 it was uprated to 4000 kg (8,818 lb). By the time production of the RL was completed in 1969 over 70,000 had been built for both civil and military applications, and many of the vehicles had been exported. Even in 1985 many RLs remain in service with the British armed forces.

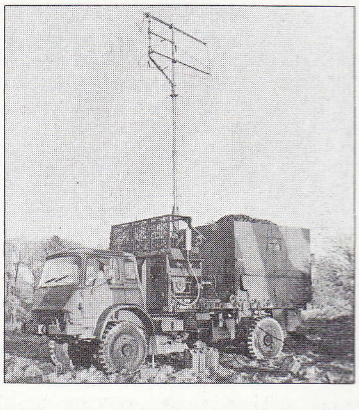
In the 1960s a competition was held to find a successor to the RL, and after exhaustive tests with prototype vehicles submitted by Austin, Commer and Vauxhall, the last was selected. This was called the **Bedford MK** and based on the civil 4×2 TK truck chassis, though the many modifications for military use included a different engine, all-wheel drive, larger tyres, military lighting and stowage. In 1985 the MK remains in production for both military and civilian applications, some 37,000 having been built for the home and export markets. The MK can carry 4530 kg (9,987 lb) across country, and can tow a trailer weighing up to 5080 kg (11,199 lb).

The MK has an all-steel fully-enclosed forward control cab, and many vehicles are provided with a roof opening on which a 7.62-mm (0.3-in) machine-gun can be fitted to provide low-level air defence. The rear cargo body is built and fitted by Marshall of Cambridge, and has drop sides and tailgate, removable bows and a tarpaulin cover. The basic model is powered by a Bedford six-cylinder diesel developing 103 bhp (76.8 kW), but a number of other engines are also offered, such as a six-cylinder petrol engine and a six-cylinder turbocharged diesel. The engine is coupled to a manual gearbox with four forward and one reverse gear and a two-speed transfer case. Suspension, front and rear, consists of semi-elliptical springs with hydraulic shock absorbers.

The MK can be fitted with a wide range of optional equipment to suit almost every conceivable operator requirement, including a winch with a capacity of 3500 kg (7,716 lb), single or rear dual wheels, troop seats down each side of the cargo area, a five-speed gearbox, stowage racks for equipment and rifles, and power-assisted steering.

For carrying cargo on pallets the dropsides and tailgate can quickly be removed, and to assist in the loading and unloading of cargo many vehicles have been fitted with a hydraulic crane to the cab rear. The MK can also carry the CB 300 container, which is used for many roles including specialist repair for forward units. It is also used to carry the Gloster Saro demountable bulk fuel dispensing unit to refuel vehicles and helicopters in forward areas. Other MKs are used to carry portable trackways, and to serve as aircraft refuellers and recovery vehicles, and so on. The TK 4×2 version is widely used for carrying stores in rear areas and for driver training as they are more fuel efficient than the 4×4 trucks.

Right: The Bedford MK 4000 kg (8,818 lb) 4×4 truck is the standard vehicle in its class in the British Army. This Bedford is fitted with a communications cabin with its generator to the immediate rear of the three-man cab.



Specification
MK

Crew: 1+1

Weights: empty 5120 kg (11,287 lb); loaded (cross-country) 9650 kg (21,274 lb)

Powerplant: one Bedford 6-cylinder diesel developing 76.8 kW (103 bhp)

Dimensions: length 6.579 m (21 ft 7 in); width 2.489 m (8 ft 2 in); height (cab) 3.404 m (11 ft 2 in)

Performance: maximum road speed 77 km/h (48 mph); maximum range 560 km (348 miles); gradient 49 per cent; side slope 25 per cent; fording 0.76 m (2 ft 6 in)

SPAIN

Pegaso 3055 6000-kg 6×6 truck

Pegaso is the leading truck builder in Spain, and it was natural that the Spanish army should turn to this company for its trucks. For many years the Spanish army used mainly American 2.5- and 5-ton trucks (and many of these remain in service today) but Spain, in common with many other countries, wanted to become more independent of its outside suppliers. This was not only for political reasons, but also to build up its own technological bases, to save on foreign exchange costs and, if possible, to bring in foreign exchange through exports. Thus Pegaso initially built an improved model of the Dutch DAF YA 414 called the **Pegaso 3045**: the first vehicles were built mainly of components supplied by DAF, but gradually the local content increased and in the end almost all of the vehicle was built in Spain. The Pegaso 3045 could carry 3000 kg (6,614 lb) of cargo across country and 6000 kg (13,228 lb) on roads. The **Pegaso 3050** 6000-kg (13,228-lb) truck has the same cab as the 3045, and in addition to being used as a cargo truck is also employed to tow artillery and semi-trailers, mount multiple rocket-launchers and serve as a recovery vehicle.

The latest Spanish truck is the **Pegaso 3055** 6×6 vehicle, which can carry 6000 kg (13,228 lb) of cargo across country or 10000 kg (22,046 lb) on roads. The cab is at the front of the vehicle, and has a forward-folding windscreen and a removable canvas top. The engine, which is mounted at the front of the vehicle, is coupled to a manual gearbox with six forward and one reverse gear and a two-speed transfer case. Suspension, front and rear, consists of semi-elliptical leaf springs, the front units having hydraulic shock absorbers. The rear cargo area has a drop tailgate, removable bows and a tarpaulin cover, and bench seats are provided for 30 troops. The vehicle can tow a trailer or weapon weighing up to 14500 kg (31,967 lb) on roads or 7500 kg (16,535 lb) across country, and optional equipment includes a winch with a capacity of 6000 kg (13,228 lb).

Variants of the Pegaso 3055 include a tipper or dump truck, a recovery vehicle and a tanker, while there are box bodies for specialized roles such as workshop, command and food carrier.

Specification
Pegaso 3055

Crew: 1+1

Weights: empty 9000 kg (19,842 lb); loaded (cross-country) 15000 kg (33,069 lb)

Powerplant: one Pegaso Model 9220/10 6-cylinder diesel developing 164.1 kW (220 hp)

Dimensions: length 7.00 m (22 ft 11.6 in); width 2.40 m (7 ft 10.5 in); height (cab) 2.765 m (9 ft 0.9 in)

Performance: maximum road speed 80 km/h (50 mph); maximum range 550 km (342 miles); gradient 51 per cent; side slope 30 per cent; fording 1.0 m (3 ft 3.4 in)

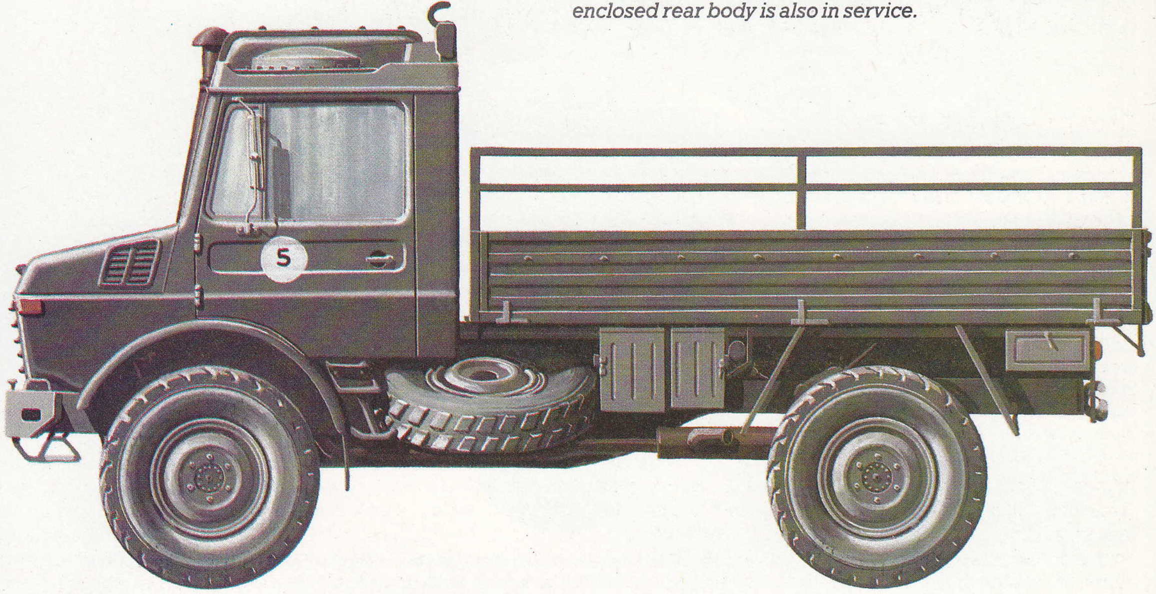
For many years the Pegaso 3045 3000-kg (6,614-lb) truck was the standard vehicle in its class in the Spanish army. A special model called the 3045DV was built to meet the requirements of the Spanish marines, and this can ford to a maximum depth of 2 m (6 ft 7 in).

WEST GERMANY

Mercedes-Benz U 1300 L 2250-kg 4×4 truck

After the end of World War II the **Mercedes-Benz Unimog** truck was designed for industrial and agricultural use, and this entered production in 1949. Since then the vehicle has been continuously developed until it now comprises a complete family of 4×4 vehicles with exceptional cross-country mobility. In the last 30 years or so it has been adopted by many armed forces, the West German army selecting the **U 1300 L** variant to meet its requirements for a vehicle carrying 2250 kg (4,960 lb) of cargo across country and towing a trailer or weapon weighing up to 8500 kg (18,739 lb). An order for no less than 17,000 vehicles was placed with Mercedes-Benz in 1978, with final deliveries to be made in 1989. The U 1300 L has also been selected by New Zealand, while the Australian army is to receive 1,295 of the heavier **U 1700 L** series, which will be assembled in Australia with some local content.

The U 1300 L used by the West German army is essentially a standard commercial 4×4 vehicle with a number of modifications such as military cargo body with removable sides and tailgate, bow and tarpaulin cover, 24-volt electric system, lashing points, observation hatch in the roof and stowage for personal kit and small arms.



Mercedes-Benz Model U 1300 L 4×4 truck of the West German army with bows and tarpaulin covers removed. This truck can also tow a trailer or weapon weighing a maximum of 8500 kg (18,739 lb). An ambulance version with enclosed rear body is also in service.

The layout of the U 1300 L is conventional, with the engine at the front, the fully-enclosed cab in the centre and the cargo area at the rear. The all-steel cab is fully insulated and provided with a heater as standard equipment; to allow maintenance access to the engine the cab can quickly be tilted forwards. The engine is coupled to a cascade gearbox with a planetary gear group flanged on the transfer case, giving a total of eight forward and four reverse gears. The suspension consists of semi-elliptical springs and hydraulic shock absorbers, and steering is power-assisted. The latter is often regarded as a luxury, but for extended cross-country driving it must be considered essential as it makes the driver's task a lot easier. If required the vehicle can be delivered with a front-mounted winch. The only variant used by the West German army at present is a fully enclosed ambulance.

To give some idea of the roles Unimogs undertake with an army today, it is worth looking at the roles envisaged by the Australian army for its vehicles: of the 1,295 to be delivered by 1987, 858 will be the basic cargo model, 287 cargo vehicles with winches, 76 cargo trucks with cranes for loading and unloading operations, 69 dump trucks with winches, and the remaining five fitted with augers/pole erectors. The Royal Air Force uses short-wheelbase (SWB) Unimogs for towing the BAe Harrier VTOL aircraft when it is deployed in the field. The chassis of the Unimog is also used as the basis for a number of armoured personnel carriers such as the UR 416.

Specification

U 1300 L

Crew: 1+2

Weights: empty 5250 kg (11,574 lb); loaded (cross-country) 7500 kg (16,535 lb)

Powerplant: one Mercedes-Benz OM-352 6-cylinder diesel developing 71.6 kW (96 hp)

Dimensions: length 5.54 m (18 ft 2.1 in); width 2.30 m (7 ft 6.6 in); height (including tarpaulin) 2.83 m (9 ft 3.4 in)

Performance: maximum road speed 80 km/h (50 mph); maximum range 900 km (559 miles); gradient 70 per cent; side slope 30 per cent; fording 1.2 m (3 ft 11.2 in)

Between 1978 and 1987 the West German army is expected to take delivery of some 17,000 of these Mercedes-Benz Model U 1300 L 4×4 Unimog trucks. The model shown here is fitted with a 20-mm anti-aircraft mount in the rear cargo area.

WEST GERMANY

MAN 5000-kg 4×4 truck

In the late 1950s the West German army started to draw up its requirements for a second generation of wheeled vehicles, even though the first generation types were only then entering service. The new range was to include an 8×8 amphibious armoured car which eventually entered service as the Luchs, 4×4 and 6×6 amphibious armoured load carriers (the latter entering production as the Transportpanzer 1 or Fuchs) and a series of 4×4, 6×6 and 8×8 high-mobility cross-country trucks, some of which were required to have an amphibious capability. To develop this range of vehicles two groupings were formed, and in the end Daimler-Benz developed the armoured vehicles (although production was undertaken by Thyssen Henschel) while the Joint Project Office (including MAN) developed the trucks.

Late in 1975 MAN was awarded a contract for 8,385 **MAN 4×4, MAN 6×6** and **MAN 8×8** Category 1 trucks worth over DM1,400 million. The first production vehicles were completed at MAN's facility at Watenstedt in 1976, and final deliveries were made in 1981. The 4×4 model has a nominal payload of 5000 kg (11,023 lb), while the 6×6 version can carry 7000 kg (15,432 lb) and the 8×8 variant is rated at 10000 kg (22,046 lb). The Canadian Armed Forces have a small number of 8×8 vehicles, and the US Army uses the type as part of the ground-launched cruise missile (GLCM) system. The 6×6 model has been produced in Austria by OAF as the **Type 20.320** for the Austrian army, and in this application the model has been upgraded to 10000 kg (22,046 lb).

These vehicles share many common components such as cabs, axles, wheels, tyres and so on, and these are standard commercial parts. The forward control cab can be tilted forward to allow access to the engine for maintenance purposes; an observation hatch is provided in the roof, and if required a 7.62-mm (0.3-in) machine-gun can be fitted here for anti-aircraft defence. The rear cargo area has removable drop sides and tailgate, bows and a tarpaulin cover. Many of the MAN vehicles are fitted with a Rotzler winch. The MAN 4×4 truck is used to carry containers and other specialized bodies, such as the Contraves Fieldguard artillery fire-control system used with the Light Artillery Rocket System (LARS) of the West German army.

The MAN 5000-kg (11,023-lb) 4×4 truck shares many automotive parts with the MAN 6×6 and 8×8 trucks, of which over 8,300 are now in service with the West German army.

Specification

MAN 4×4

Crew: 1+2

Weights: empty 9700 kg (21,385 lb); loaded (cross-country) 14300 kg (31,526 lb)

Powerplant: one MAN V-8 diesel developing 190.9 kW (256 hp)

Dimensions: length 8.02 m (26 ft 3.75 in); width 2.50 m (8 ft 2.4 in); height (cab) 2.86 m (9 ft 4.6 in)

Performance: maximum road speed 90 km/h (56 mph); maximum range 700 km (435 miles); gradient 70 per cent; side slope 30 per cent; fording 1.2 m (3 ft 11.2 in)

Royal Navy

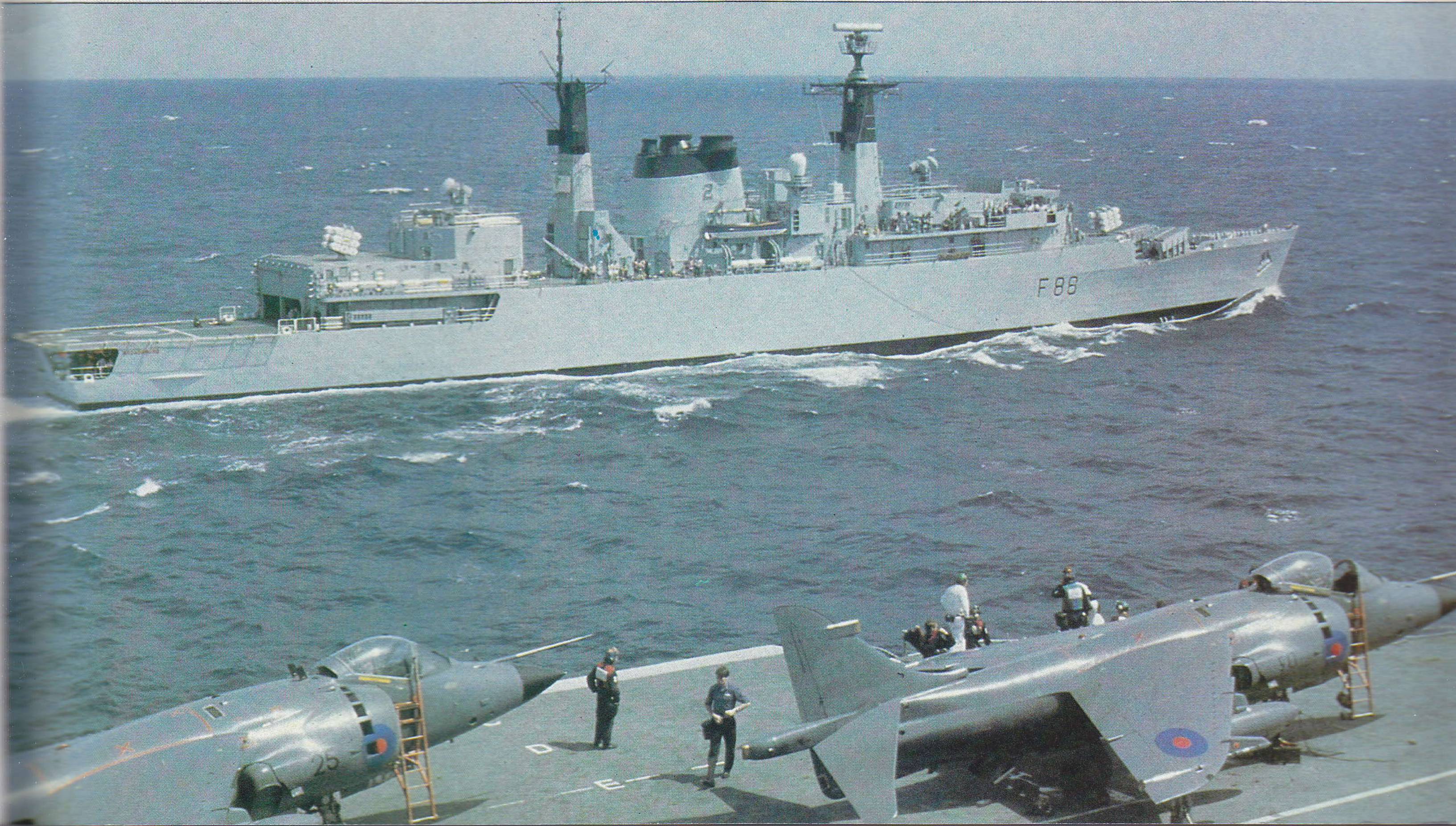
Part 2

Destroyers and frigates

The backbone of the Royal Navy is formed by its destroyer and frigate flotillas. The former is constituted by three batches of the Type 42 destroyer that provide the primary anti-air warfare missile defence for the fleet with the twin-rail GWS-30 Sea Dart system. This is a 65-km (40-mile) range Mach-3.5 low/high-altitude SAM that proved itself in the Falklands war; but like a number of other weapon systems used in the Falklands, the GWS-30 system was also found wanting in some key areas. The small number of reload missiles carried by each Sea Dart ship is also a cause for concern because a Soviet saturation attack by aircraft and missiles would swamp the system because (amongst other things) of poor computer/human interface response time and reloading. The ships' ASW armament is minimal, and apart from a 4.5-in (114-mm) gun there is no surface-to-surface capability other than the Lynx helicopter and a secondary role for the Sea Dart system.

The inner zone of point-defence missiles is gradually being switched from the vessels armed with Sea Cat missiles to the Type 22 frigates which provide 'goalkeeper' services to otherwise unprotected high-value surface targets. Armed with the GWS-25 fully automatic Sea Wolf missile system, the Type 22 ships are designed primarily for ASW operations in the Greenland-Iceland-UK (GIUK) gap. However, because of the lessons of the Falklands war the Type 22 Batch 3 vessels of the 14-ship class will carry both a 4.5 (114-mm) gun and two Dutch 30-mm Goalkeeper CIWS (close-in weapon system). The Type 22 Batch 2 and 3 vessels will also carry the Type 3031(Z) towed sonar array, and all three sub-groups will eventually be fitted with the Type 2050 hull-mounted active sonar system. The major disadvantage of the class is the fact that the Sea Wolf launchers are hand reloaded, which makes the ships vulnerable to stream saturation attacks. To rectify this the new Type 23 'Daring' class frigates that are to be ordered in the next year or so will be fitted with the GWS-26 vertical-launch Sea Wolf system. It is possible that the Type 22 Batch 3 ships may also be fitted with GWS-26. Both the Type 22 Batch 3s and the 'Darings' will also be fitted to carry the US Harpoon surface-to-surface anti-ship missile in two quadruple launchers. The Harpoon will replace the current French MM.38 Exocet in that role, and will enable the launch platform to engage surface targets at well over twice the range currently possible with the MM.38. To complement the weapon systems new decoy launchers, ESM (electronic support measures) equipment and active jammers will also be fitted to enhance survivability.

To bolster the modern destroyer and frigate force there are 24 'Leander' class and six Type 21 frigates in service with a diminishing number of older vessels. Since entering service the 'Leanders' have undergone extensive refits that have resulted in six separate sub-groups that vary from the Ikara ASW conversion to the Sea Wolf SAM/Exocet SSM (surface-to-surface missile) conversion in scope. Although at present still numerically the most important of the Royal Navy's surface fleet, the 'Leander' class is gradually to decrease in numbers as the older ships are replaced by new-build vessels. The fate of the six remaining Type 21s is also somewhat of a mystery at present as stability problems mean that they cannot be rearmed with new weapon systems. Most of them also suffered major hull cracking problems when they served in the South Atlantic, so their time in the fleet may well be numbered. One possibility being explored to offset any possible lack of frigates is the design and construction of a number of heavily armed corvettes to operate around the UK's coastal waters and in areas like the West Indies. There are already five 'Peacock' class corvettes in service with the Royal Navy armed with an OTO-Melara Compact 76-mm (3-in) gun and four single 7.62-mm (0.3-in) machine-guns. These were funded mainly by the government of Hong Kong to replace five ex-'Ton' class patrol ships that were used to patrol the colony's waterways. The individual needs of the Falklands have also been met by the purchase and conversion of three ice-strengthened commercial oilfield supply tugs. Named HMS *Sentinel*, HMS *Protector* and HMS *Guardian*, these have now deployed to the South Atlantic to release some of the major surface combatants for NATO duties. They are joined in that duty by the ice patrol ship HMS *Endurance*, whose proposed scrapping in 1982 was a major signal to Argentina that the UK was no longer interested in the Falklands. For coastal patrol around the UK and for fishery protection duties there are seven 'Isles' class, two 'Castle' class and six 'Ton' class minesweepers which operate under the auspices of the Coastal Squadron. Their armament is minimal, but the two 'Castle' craft have a minelaying capability that has been tested in trials.



HMS Broadsword, *first of the 'Type 22' class frigates, provides 'goalkeeper' protection to the carrier HMS* Hermes. *The fitting of Sea Wolf missiles has made the class potent close air defence vessels.*

12 PASS

The ice patrol ship HMS* Endurance *won a reprieve from the scrapyard as a result of the Falklands war, and so remains to serve the scattered British scientific stations on the coasts and islands of Antarctica.

The Royal Navy's only other surface minelaying capability is provided by the exercise minelayer and MCMV (mine countermeasures vessel) depot ship HMS *Abdiel*. In wartime the laying would be undertaken by requisitioned roll-on/roll-off ferries in the manner of the vessels used by the Libyan navy. Any offensive laying would have to be done by the submarine force or by RAF aircraft such as the BAe Nimrod or Lockheed Hercules. To find and destroy enemy ground mines laid in coastal waters the Royal Navy maintains in service a force of about 15 elderly 'Ton' class minehunters. These are being slowly supplemented by 15 'Hunt' class MCMVs with GRP (glass-reinforced plastics) hulls and the French PAP104 mine-disposal system. The 'Tons' will eventually be replaced by a class of single-role GRP-hulled minehunters that is currently being designed. Conventional minesweeping operations are still being undertaken by a number of 'Ton' class vessels, which are being replaced in RNR service by the 'River' class of fleet minesweeper which was designed specifically to deal with the Soviet continental shelf, deep water rising and underwater electrical-potential mine types that will be sown along NATO submarine transit routes. To assist the regular sweepers in wartime the Royal Navy will requisition some 40 or so deep-sea trawlers that will be equipped with the Extra Deep Armed Team Sweep gear for tackling moored mines at most depths.

Auxiliary ships

To support the fleet the Royal Fleet Auxiliary (RFA) has a wide range of underway replenishment ships and tankers. The Falklands War has seen the reduction of the RFA fleet stopped and has shown the need for its vessels to be armed with both self-defence weapons and ASW stores for the helicopters they carry for VERTREP (vertical replenishment) operations. For the future, a new class of fast combat support ship is under development that will carry Sea Wolf SAMs and an air group of six ASW helicopters together with facilities to service BAe Sea Harrier V/STOL fighter-bombers. In addition to the air-capable replenishment ships the RFA also operates two aviation support ships, the *Reliant* fitted out as the Arapaho concept containerized air support trials ship and the replacement for the current helicopter support ship *Engadine*, the ex-*Container Bezant* which is undergoing a two-year conversion and will carry up to six Westland Sea King-sized helicopters and have the facilities necessary for operating up to 12 Sea Harriers if required. The RFA also crews the five LSLs (landing ships, logistic), and two ex-merchant logistic ships in support of the Royal Marines and British army, each of whom operates a number of LCVPs (landing craft vehicle, personnel), LCU (landing craft, utility) and logistic landing craft for its own use.

There are also in service a considerable number of other support and auxiliary craft such as salvage vessels, tugs, tenders and the like, of which the most important are the *Diligence*, a maintenance and repair ship, and the *Challenger*, a seabed operations vessel. The royal yacht *Britannia* is also included in the navy list with a wartime role of hospital ship, but during the Falklands war she was conspicuous by her absence through fuel-compatibility problems. Her role was undertaken by the liner *Uganda*, with the survey vessels *Hydra, Hecla* and *Herald* serving as ambulance ships.

The Royal Navy's hydrographic service operates four offshore, four coastal and four inshore surveying vessels, which are totally inadequate for the workload assigned to it. Hopefully by the mid-1980s the work performed will be for military purposes only as all the civilian work is to be transferred to the Department of Trade. There is to be a small expansion of the hydrographic service within the foreseeable future as a new coastal survey ship, the *Roebuck*, has been ordered.

Seen during a NATO exercise making an underway replenishment of (left) a 'Knox' class frigate of the US Navy and (right) a Canadian 'Iroquois' class destroyer, the 'Rover' class small fleet tanker can carry over 6000 tonnes of fuel products.